(20) VII/58

Minutes of the Committees of Council on Education with Appendices

1842 – 43

Plans of School Houses

Sub. – Education/ England/ Minutes of Committee of Council on Education

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MINUTES

OF THE

COMMITTEE OF COUNCIL ON EDUCATION;

WITH

APPENDICES,

AND

PLANS OF SCHOOL-HOUSES.

1842-43.

LONDON:

PUBLISHED, FOR HER MAJESTY'S STATIONERY OFFICE,

BY

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ERRATA.

Page 116.—Ten lines from bottom, for "6000*l.*," read "5000*l.*"

Page 278.—Five lines from the top, for "The Patrons and Friends of Pupils towa the Expenses of their Training;" read, "The Committee of Council on Ed cation towards the expense of Establishing the Schools."

Council Chamber, Whitehall, November 22, 1843.

By the Right Honourable the LORDS of the COMMITTEE of COUNCIL on EDUCATION.

The Committee of Council have before them the Orders in Council, dated the 3rd day of June, 1839, and the 10th of August, 1840, together with their Minutes of the 24th September, 1839, and the 3rd December, 1839, and also a Supplementary Minute of December, 1840.

Their Lordships having considered the objects to which the grants made by Parliament for the Promotion of Education in Great Britain are applicable under these Orders and Minutes, are of opinion that, without departing from the principles upon which they are framed, other modes of distribution may be adopted so as further to promote the improvement and extension of Elementary Education.

Schoolmasters' Houses.

Their Lordships will make grants towards the providing or enlarging of houses of Schoolmasters and Schoolmistresses where School-rooms have been erected (either with aid from the Parliamentary Grant, or otherwise); but where no house has been built, or no sufficient dwelling been provided, for the Master or Mistress, upon the following conditions:—

1. That the School for which such house or dwelling is to be built or enlarged, has been conveyed to Trustees for the Education of the Children of the Poor.

2. That their Lordships are satisfied, by the report of their Inspector, that the School is efficiently conducted.

3. That the right of inspection of the School is secured by the deed of trust, or by an endorsement thereon.

4. That the site and premises are to be conveyed to Trustees, as a residence for the Master or Mistress.

5. That their Lordships are satisfied, by the report of their Architect, that the proposed building will be substantial in structure and sufficient in size, the Subscribers or Trustees being otherwise at liberty to select their own plans.

6. That their Lordships are satisfied with the amount of local contributions to the new building.

Apparatus for School-Rooms.

The Committee of Council will also make grants towards enabling the Trustees or Managers of any School to provide the School-room suitably with furniture and apparatus which may be necessary, in the first instance, to enable them to commence teaching in the School; and that not only in the case of new Schools, but where it is proposed to establish a Day School where a Sunday School only has previously been kept.

Training Schools.

The Committee have further considered the mode in which they can assist in the establishment of Normal Schools for the training of Masters and Mistresses; and in future, if, upon consideration of any application for aid to such Schools which may be brought before them, they shall think fit to accede to that application, they will confine their grant to a proportion of the original expense of the building, and will not, in any case, make an annual grant towards the maintenance of such School.

The Committee will require that, in future, all applications for aid to Normal Schools shall be conveyed to them through the Committee of the National Society, or that of the British and Foreign School Society.

The Committee will also require that the inspection of the Normal School receiving such aid shall be secured by the deed of trust; and also, that the site and premises of such school shall be conveyed to Trustees, for the Training of Masters and Mistresses.

Inspection.

The Committee of Council have also had under their consideration the inadequacy of their present means of rendering the

Inspection of Schools which have been aided by the Parliamentary Grant effectual for its object, inasmuch as there has hitherto been one Inspector only appointed for all the Schools in connexion with the National Society and the Established Church, throughout England and Wales; and another for the Schools in connexion with the British and Foreign School Society.

Their Lordships will therefore recommend to Her Majesty to appoint, as soon as may be, such an additional number of Inspectors as will be sufficient to insure a periodical inspection in the most populous and manufacturing districts, once, at least, in every half year, of those Schools connected with the National Society or the Established Church which have been aided by the public grants.

In like manner their Lordships will provide for a periodical inspection of the Schools in connexion with the British and Foreign School Society in those districts.

Their Lordships cannot doubt that the effects of such a system of Inspection will be the improvement of the Schools visited, as well as an increase of local efforts to promote Elementary Education; and they will thereby be enabled hereafter to determine whether it may not be expedient to provide, in a similar manner, for a periodical Inspection of other districts.

Grants in Poor and Populous Places.

Their Lordships are prepared to give full effect to that portion of the Order of the 3rd of June, 1839, which contemplates the making of larger grants towards the erection of Schools in poor and populous places than are required elsewhere; and they will, in all cases whatever, consider the amount of grant to be made without reference to the plan of any proposed School having been drawn by their Architect.

Council Chamber, Whitehall, Jan. 16, 1844.

Their Lordships having referred to that part of their Minute of 22nd Nov. 1843, which regards Normal Schools for the training of Masters and Mistresses, think it desirable to determine what information they will require from applicants for aid towards the building of such Schools, and also to define, with more precision, the proportion of the original expense of the building of such Schools for which they will, under the Minute, make grants in cases where they may think fit to accede to such applications.

Their Lordships will, in the first instance, require Answers to the several Queries contained in the list hereunto annexed; and if they should require further information, they will, if necessary, direct their Inspector to go to the place where the School is proposed to be built, and to report to them.

If their Lordships should, in consequence of such inquiries, be satisfied that the application ought to be acceded to, they will make a grant of a sum of money equal to 50*l.* for every pupil which the proposed building is calculated to accommodate; that is to say,—if it is to accommodate ten pupils, 500*l.*; if twenty pupils, 1000*l.*, and so on.

Their Lordships will also grant the usual rate of aid towards the erection of the Model Schools.

QUESTIONS to be answered as a preliminary to the consideration of any application for a grant towards the Erection of a Normal and Model School.

1. The site on which the Normal School is to be erected is situated in or near Street [or road], being a plot of ground lying between or near

2. State the extent of the site, and how it is bounded.

3. Will the Model or Practising School be erected within the same boundary? If not, at what distance will the Model School be from the Normal School?

4. How many trustees will be appointed?

5. Give their names, professions, &c.

6. Furnish (on a separate sheet of paper) a brief but precise statement (not a regular abstract, unless subsequently required) of the title of the present owner of the site proposed for the Normal School; and if the Model School is to be erected on a separate site, then also a similar statement of the title of that site.

7. Describe the means by which the site or sites will be drained; stating the distance which collateral drains will have to run, and the nature of the main drain.

8. Are any vitriol works, tanneries, size manufactories, slaughter-houses, or other noxious trades situated near the site or sites?

9. Is it, or either of them, in the neighbourhood of any undrained marsh or swampy ground; any large uncovered drain, or large stagnant pool?

10. What is the nature of the soil and superficial bed on which the foundation will rest?

Building.

11. Furnish detailed specifications of the structure of the building, or buildings, if separate.

12. You are requested to furnish a plan of the proposed buildings, showing the accommodation which is to be provided:—

1. For the residence of the Principal, Vice-Principal, and any Masters.

Explain the means provided for the inspection of the premises at all hours by the Principal and Masters.

2. For the kitchen, scullery, and domestic offices.

Show how the housekeeper and servants are to be lodged and to work, so as to be at all times separate from the school.

3. For the class-rooms, library, and dining-room.
The arrangements for each class of students, while under instruction, should be drawn in the plan, as well as the position of the tables in the dining-room.
4. Dormitories.
Show the position of the beds, the mode of lighting, and the arrangements for inspection at night.
5. Washing-room.
The mode of supplying water, &c.
6. Cloak and hat rooms.
7. Shoe-house.
8. Knife-house.
9. House for domestic uses.
10. Tool-house.

13. Furnish also a plan of the Model or Practising School, showing

1. The elevation.
2. Ground plan.
3. Arrangements for classes.
4. Mode of warming and ventilating.
5. The play-ground.
6. The Master's house.
7. The out-buildings.

14. Ventilation.—State in what manner the school buildings are to be ventilated and warmed.

15. What extent of enclosed ground will be provided for the employment and exercise of the students?

16. Which of the following subjects are to be included in the scheme instruction?

1. Religious instruction.
Under what heads?
2. Reading.
3. Writing and book-keeping.
4. Arithmetic.
5. Mensuration of planes and solids.
6. Algebra.
7. Whether any mathematics; and if so, in what form, and to what extent?
8. English grammar.
9. Etymology.
10. English history.
11. Geography.
12. Explanation of natural phenomena.
13. Whether mechanics; and if so, in what form and for what object.
14. The organization, discipline, and management of Elementary Schools.
15. What "methods" will be taught?
16. Will Latin be taught?

17 At what age will the students be received into the school?

18. During what period will they be required to reside.

19 What part of that period will they be required to devote to daily teaching in the Model or Practising School?

20 What sum will each student be required to pay towards the expenses of his maintenance and training?

21. Will any exhibitions be granted? If so, how many, of what amount, and how will their distribution be regulated?

22 What officers are to be appointed for the instruction and training of the students of the Normal School, and at what salaries?

Principal	£	per annum
Vice-Principal		
How many Masters? .		
Superintendent of household and garden-work		
Master of Model or Practising School . .		

23 What is the scheme of expenditure likely to be annually incurred under the following heads?

1 Salaries of Principal and all Masters
2 Books, stationery, apparatus, and tools.
3 Ground rent and repairs
4 Taxes and rates
5 Fuel and lights
6 Supply of water
7 Clothing, linen, and furniture
8. Food
9 Servants' wages
10. Medical attendance and sundry incidental expenses
11 Exhibitions

24 State your reasons for expecting that the Schools will be efficiently and permanently supported State probable amount of

1 Annual subscriptions and donations,
2 Annual collections,
3 Annual produce of endowment,
4 Annual payments by the patrons or friends of students trained as schoolmasters,
5 Any other source of income

25 What is the estimated cost of the building? State separately the cost of

1 The Site,
2 The Model or Practising School,
3 The Normal School, including the apartments for the residence of the Principal, and of the students, and any Masters,
4 The boundary fences,

5. The amount of the legal expenses,
6. And any other expenses.

(The answers to the above questions must be signed by the builder, or by the architect and builder, if the plans were not drawn in the Council Office)

26 What is the amount now raised by subscription to meet this expenditure?

27 How much do the promoters expect to raise by subscriptions and donations, in addition to the above?

28. Have you applied to any society, or other similar source for aid; and if so, what has been granted or promised, or on what grounds has the application been refused?

29 Do you intend to apply to any society or other source for aid?

30 What will be the extent of the deficiency in the funds for the erection of the Normal and Model School buildings, after you have collected all your subscriptions and donations, not including any grant from the Committee of Council.

The above questions, and the replies to them, were read and signed at a meeting of the School Committee [or Trustees] of the School, duly convened on this day of 184 at

ution_1842_3.

PLACE

MINUTES

OF THE

COMMITTEE OF COUNCIL ON EDUCATIO

1842-3.

Battersea Normal School.

At a Meeting of the Committee of Council on Education, held November 11, 1842:

Read, the Minute of this Committee, dated 23rd June, 1841, and presented to Parliament in the session of 1842, relating to the Battersea Normal school.

Read a letter from Mr. Kay Shuttleworth and Mr. Edward Carleton Tufnell, stating that the expenses of establishing the school, and maintaining it to December 1842, are upwards of 4000*l.* beyond the sums received from the patrons and friends of pupils in repayment of the charges of their maintenance and education, and that about 1500*l.* have been contributed by persons interested in elementary education towards this charge of 4000*l.*, leaving 2500*l.* in December, 1842, which sum has been advanced by Mr. Kay Shuttleworth and Mr. Edward Carleton Tufnell, for the establishment and support of the school from their private funds.

Resolved, That in consideration of the services rendered by the Battersea Normal School to the Executive Government in the education of schoolmasters, and of the number of masters now training therein, who are available for the public service, 1000*l.* be granted towards the expenses hitherto incurred in the establishment of that school, the right of inspection being secured in perpetuity.

Edinburgh and Glasgow Model Schools.

At a Meeting of the Committee of Council on Education, held 16 January, 1843:

Read, the humble petition of the Education Committee of the General Assembly of the Church of Scotland, dated 26th November, 1842; together with the minute of the Education Committee of the General Assembly, dated the 25th November, 1842; and a petition from the Committee of the Glasgow Society, dated the 26th November, 1842.

e foregoing documents their Lordships learn, th
gow Education Society are prepared to convey th
5. buildings of their Normal seminary to the Genera
6y in trust for ever as model elementary schools (for
(T cation of the poor of the city of Glasgow), and as a
l school for the instruction and training of schoolmasters
mentary schools for the children of the labouring classes,
; maintained and conducted by the General Assembly.
t certain members of the Committee of the Glasgow
ucation Society will assume, as an individual and personal s
ponsibilty, all debts owing by that society, after the 5000*l.*
as been applied to the liquidation of such debts; that the
General Assembly will sustain no responsibility whatever with
respect to the claims of any creditors on the Glasgow Education Society; and that the creditors will have no claim on the buildings, which will be subject to no mortgage either on the part of the Society or of the Assembly.

Resolved, That the grant of 5000*l.* be paid whenever the remaining terms of their Lordships' Minute are fulfilled, viz.:—

That the draft of the deed by which the Glasgow Education Society convey their schools to the General Assembly be submitted to their Lordships before it is executed, in order that it may be examined by their counsel, and that the deed be not executed until it has been approved by their Lordships.

That the inspection of the Glasgow Model and Normal schools by Her Majesty's inspector be secured in the trust deed.

That an attested copy of the deed, when registered, be transmitted to the Council Office, to be there preserved.

Resolved, That the Education Committee of the General Assembly shall be at liberty to permit the Glasgow Education Society to apply to the liquidation of the debt remaining after the payment of the 5000*l.*, such funds as may arise from subscriptions and collections in Glasgow, and a proportion of other subscriptions and collections to the Normal schools of the Assembly as described in their minute of the 25th November, 1842; but that the Education Committee of the General Assembly shall not enter into any conditional agreement (with the Glasgow Education Society, or with the persons becoming responsible for this debt), rendering the General Assembly liable to any portion of the debts of that society or of these individuals, provided the funds derived from subscriptions and collections should be insufficient to defray the remaining debt of the Glasgow Education Society, or should by any accident be lost or misapplied; or provided the Education Committee of the Assembly in any other way fail in furnishing any such funds from subscriptions and collections in Glasgow or elsewhere, towards the liquidation of the remaining debt of the Glasgow Education Society.

the Education Committee of the General Assembly and their Lordships shall respectively be 2500*l.* instead of 5000*l.*

I am to request that, as soon as the site has been selected and the plans prepared, they may be submitted for their Lordships' approval, and to say that their Lordships will be ready to instruct their architect to prepare, without charge, a sketch of the plan of the proposed schools, in accordance with any instructions which the Education Committee may furnish him for his guidance, if that arrangement will prevent expense, or promote the early success of the plans of the Committee.

If the Education Committee desire the assistance of their Lordships' architect, they will therefore furnish him with a plan of the site, and with the requisite instructions. With regard to the annual sum of 500*l.* which their Lordships expressed their willingness to grant towards the maintenance of these schools, they think it right to ask for further information, inasmuch as the reduction of the expenditure upon the building will, as they conceive, diminish necessarily the extent of accommodation, and consequently of the maintenance of the establishment, towards which they consented to make that grant.

I have the honour, &c.,

(Signed) J. P. KAY SHUTTLEWORTH.

John Gordon, Esq.

Secretary to the Education Committee of the General Assembly of the Church of Scotland.

SIR, Edinburgh College, September 16, 1843.

YOUR communication of the 1st current has been laid before the General Assembly's Education Committee. They desire me to express their grateful acknowledgments that the Committee of Council have been pleased to assent to the proposed alteration in the scheme of expenditure upon the building for a Normal School in Edinburgh, by agreeing that the sums to be contributed towards the object by them and by the Committee of the General Assembly shall be respectively 2,500*l.*, in place of 5,000*l.*, as formerly proposed.

I have further to signify that no delay will take place in the selection of a proper site for the building; and that the Committee will very thankfully receive the assistance of their Lordships' architect in the preparation of a plan. They could wish also to have their Lordships' permission to confer with that gentleman, even now, in the choice of a site.

In the plan of the building to be submitted for their Lordships' approval, it will be kept in view that the great object of the seminary is to afford to young men a complete training for the office

of elementary teachers; and that the classes which are to give the opportunities of practice in teaching, and which form what is called the Model School, will be assembled there mainly in subservience to that object, consequently that a considerable variety of accommodation must be provided; in particular, convenient class-rooms for the Model School and for the instruction of students under training, a library room, and a room for apparatus. They reckon that the sum which is now at command will suffice for the erection of a building suitable in these and all other particulars to the purpose in view.

The Committee observe with the highest respect the solicitude so considerately expressed by their Lordships, that the students under training may have every possible advantage for the successful prosecution of their studies, and for the right formation of their characters. They participate in that anxiety; and though it be not now proposed that the building be constructed for the residence of the students, they are deeply sensible of the importance of these young men living much under the eye and direction of the rector; and from the first, the necessity has been perceived of making some very careful provision for their lodging, in whatever part of this large city it may be chosen. To this matter, therefore, they intend to direct their particular attention.

Their Lordships have requested information as to the probable annual expenditure upon the seminary when carried on in the building now proposed. The Committee are of opinion that to maintain it according to its rank as an establishment under the Church, and honoured by the countenance and support of the Government, an expenditure will be required of at least 1,000*l.* per annum. This will be employed chiefly in defraying the salaries of the rector and his assistants, and in the maintenance of the students; and it has not been intended that the outlay in these particulars should be less than it would have been, had the seminary been carried on in the larger edifice first proposed. It is not anticipated that there will be a less resort of students, for whose maintenance provision must be made: and the Committee retain the same opinion as formerly, of the necessity of requiring the highest qualification in the masters, and of securing them by adequate remuneration. They trust, therefore, and consider it indeed essential, that their Lordships should continue the grant of 500*l.* per annum, on the condition of the like amount being advanced by the Church.

I have the honour, &c.

(Signed) JOHN GORDON.

J. P. Kay Shuttleworth, Esq.,
Secretary to the Privy Council Committee on Education.

SIR, Edinburgh College, November 27, 1843.

I HAVE the honour to transmit to the Committee of Council on Education the accompanying extract minute of the General Assembly's Education Committee, relative to the selection and feu of a site for the proposed new Normal School in Edinburgh.

I have also transmitted by this day's mail, under cover addressed to you, the plans and elevations which have been prepared by the architect of the Commissioners for the New Improvements in this City; and which the Assembly Committee will be well pleased that their Lordships direct to be submitted to the Government architect.

I have, at the same time, as directed by the minute, to express the desire of the Committee that their Lordships may be pleased, in order that the building may proceed without delay, now to remit the sum of 2,500*l.* agreed to be granted from the fund at their disposal, and to state that the Assembly Committee are prepared immediately to advance the like amount.

I have the honour to be, &c.

(Signed) JOHN GORDON.

J. P. Kay Shuttleworth, Esq.,
Secretary to the Privy Council Committee on Education.

Extract Minute of the General Assembly's Education Committee, 22nd November, 1843.

Present—

Rev. Dr. Muir.
Rev. Dr. Grant.
Rev. John Paul.
Rev. James Macfarlane.
Rev. James Veitch.
Mr. John Bowie.
Mr. James M'Innes.
Mr. D. Smith.
Mr. Adam Longmore.

The Sub-Committee, to whom the matter of selecting and feuing a site for the new Normal School in Edinburgh had been specially remitted, reported that they had, as authorized at last meeting, made offer to the Commissioners for the New Improvements, of the sum of 40*l.* per annum, as the feu duty for the stance selected for the said school, conditioning that the feu duty was not to be exigible till after the term of Whitsunday, 1845, and that this offer had been accepted. The Sub-Committee farther reported that the site fixed on was, in their opinion, peculiarly eligible, and that they were happy to find that such was also the opinion of several respectable and influential gentlemen, residenters in Edinburgh, and who take a deep interest in this national undertaking. The Sub-Committee farther reported that, as directed, they had procured plans and elevations of the proposed building from Mr. George Smith, architect, Edinburgh, and who holds the appointment of architect for the

city improvements; that as by the rules of the Commissioners for the New Improvements, the elevation and ground plan of all houses to be built on the ground belonging to the Commissioners required to be prepared by their own architect, the Committee deemed it best, under the circumstances, to request Mr. Smith also to prepare the plans of the interior arrangements; and the Sub-Committee reported that the same, as prepared by Mr. Smith and now submitted, appeared to be eminently calculated to meet the objects of the Committee.

The Committee, after consideration, unanimously approved of the proceedings of the Sub-Committee and of the plans produced, and direct that the same be forthwith transmitted for the examination and approval of the Committee of Council on Education. And in transmitting these plans they desire to explain, that the ground which has been selected for the new institution is situated on the Castle Hill Terrace and in the immediate neighbourhood of the new Assembly Hall; that as the ground slopes to the south, the front elevation of the proposed building will consist of only two storeys, while the elevation of the back will be four storeys; that this peculiarity, so far from being a disadvantage, may be viewed as the reverse, as in the under floors ample accommodation is obtained for what may be termed the domestic arrangements of the establishment; and as there is to be a separate entrance to the under storeys from the back of the house, the two great departments will thus be kept in a manner separate and distinct. It will also be seen, that in the upper floor ample provision is made not only for the apartments for the rector or head master, but also for dormitories for a limited number of the students who may be attending the Normal School.

As it is highly desirable that the building should be immediately commenced, the Committee further directed that in transmitting the plans to London, a special request should be made that the 2,500*l.* agreed to be granted by Government should be forthwith remitted to Edinburgh, that the same, together with the like amount to be furnished by the Committee, be placed in a separate and special account, to be kept with the Western Bank, Edinburgh, on account of this building. The Committee suggest the Western Bank for this purpose, as that bank acts as general treasurers to the Education Committee; and the Committee suggest that the whole sum, including the amount to be contributed by this Committee, be now deposited as above, as payments must be made from time to time to the contractors as the work proceeds.

The Committee further directed that it should also be intimated to the Committee of Council on Education that this Committee will cheerfully submit the plans of the proposed building to the Government Architect, and not only gladly avail themselves of any suggestions which that gentleman may offer, but also of his services in inspecting the building from time to time.

Committee of Council on Education,
SIR, Council Office, Whitehall, November 29, 1843.

I BEG to acknowledge the receipt of the plans and elevations of the Normal School proposed to be erected by the General Assembly of the Church of Scotland in Edinburgh. They have been referred to the architect of this department, and when they have been examined by him, I will communicate again with you on that subject.

I have also to acknowledge the receipt of the extract from the minutes of the Education Committee, dated the 22nd of November, 1843. Their Lordships have no doubt that the site selected is in all respects eligible, and that the plans will be found convenient. They trust it is unnecessary to convey to the Education Committee the assurance that they will be ready to afford them every facility in their power for the immediate execution of the plan.

Your letter, and the minute which it encloses, convey a request "that the 2,500*l.*, agreed to be granted by Government, should be forthwith remitted to Edinburgh, that the same, together with the like amount to be furnished by the Education Committee, be placed in a separate account to be kept at the Western Bank, Edinburgh, on account of this building."

I am directed, in reply, to refer the Education Committee of the General Assembly to the 5th condition in the minute respecting this grant, as communicated to that Committee on the 31st of December, 1841, viz.:—

"5thly. That the 5,000*l.* be not paid to the Education Committee of the General Assembly until the building is erected; until it is conveyed to the General Assembly; until the deed is registered; nor until all expenses incurred in the erection of the building are defrayed, excepting what will be liquidated by their Lordships' grant."

My Lords invariably require that this course be pursued before they direct the payment of any grant, whether for the erection of Elementary or Normal Schools. This will become apparent to the Committee from the perusal of the enclosed certificate, which the School Committee or trustees are required in every case to sign, as a preliminary to the payment of any grant.

If the title of the site be satisfactory, and the Education Committee feel no difficulty in framing a deed in conformity with the condition of the grant, they may proceed with the erection of the building, with the certainty of obtaining the money when the structure is completed.

Their Lordships have no doubt that upon this being known to any banker, the money will be advanced to the Assembly; but I am instructed to say that their Lordships do not feel themselves at liberty to depart from the conditions of the grant in this respect.

I shall be glad to receive from you, at an early period, a brief statement of the tenure on which the "stance" is held; and I am to request that when a draft of the proposed conveyance is prepared, it may be transmitted to this office.

Both these documents will then be submitted to their Lordships' Counsel for his approval,

I have, &c,

(Signed) J. P. KAY SHUTTLEWORTH.

John Gordon, Esq., Edinburgh.

SCHEME OF PERIODICAL INSPECTION FOR ENGLAND AND WALES.

Committee of Council on Education;
Council Office, Whitehall, December 2, 1843.

My Lord,

According to your request I submit to you the following account of the schools for which it is desirable, in pursuance of your Lordship's Minute, dated November 22, to provide a periodical inspection, together with a plan for regulating that inspection.

The populous and manufacturing districts chiefly referred to in that Minute, lie scattered over the coal-fields and mining districts of England and Wales, and include the metropolis.

The coal-fields and mines are found in the

Northern Districts.

Counties in which coal fields and mines are the causes of manufactures and density of population, arranged in districts.

In the counties of Northumberland,
Durham,
Cumberland,
Lancashire, and
Yorkshire.

In the Midland Districts in

Cheshire,
Derbyshire,
Nottinghamshire,
Leicestershire,
Warwickshire,
Staffordshire,
Flintshire,
Denbighshire,
Anglesea.

In what may be termed an *Eastern District*, there are no coal-fields nor mines.

In the *Western District* mines and coal-fields are found in

Herefordshire,
Gloucestershire,
Monmouth,
Somersetshire,
Devonshire,
Cornwall,
Pembroke,
Glamorgan,

and other parts of Wales In all these counties a dense population is

employed in manufactures or mining, and the *Metropolis* and its dependencies are still more populous.

Districts for inspection.

Upon examination I find the schools connected with the Church of England, which are liable to be inspected, naturally group themselves round these populous counties as centres, and form convenient districts for periodical inspection, which may be denominated

The Northern,
The Midland,
The Western, and
The Southern.

There remains an *Eastern District* which, though it contains neither coal nor minerals, is the seat of extensive domestic manufactures.

I propose therefore, in the first place, to lay before your Lordship a plan based on this arrangement, for the periodical inspection of schools, aided by public grants, and connected with the Church of England.

Two classes of Church schools liable to inspection.

The British schools require a separate arrangement.

There are two classes of these schools,—

First.

1. Schools which were erected with aid from the Treasury, before the establishment of the Committee of Council on Education, and the trustees of which have signified their desire to be included in a plan of periodical inspection.

Second.

2. Schools which have been erected with aid from the Committee of Council on Education, and which are liable to inspection by virtue of a clause inserted in their Trust Deeds, as a condition of the grant.

List of such schools in every county in England and Wales.

In the following list the number of each of these two classes of schools in each county in England and Wales, is enumerated for your Lordship's information; and I also submit a large map, in which the situation of each of these schools is marked:—

ENGLAND.

Counties.	Class 1.	Class 2.	Counties.	Class 1.	Class 2.
Bedford	5	9	Middlesex	3	16
Berks	3	7	Monmouth	2	2
Bucks	..	6	Norfolk	5	20
Cambridge	2	7	Northampton	1	6
Chester	9	17	Northumberland	5	5
Cornwall	6	8	Nottingham	3	5
Cumberland	..	2	Oxford	5	2
Derby	3	11	Rutland	1	..
Devon	6	13	Salop	4	9
Dorset	1	7	Somerset	7	21
Durham	5	16	Stafford	7	17
Essex	7	14	Suffolk	6	15
Gloucester	9	19	Surrey	2	13
Hants	7	14	Sussex	6	18
Hereford	2	2	Warwick	3	10
Hertford	3	12	Westmorland	1	3
Huntingdon	..	7	Wilts	7	16
Kent	4	14	Worcester	2	4
Lancaster	27	39	York	23	43
Leicester	8	6			
Lincoln	5	11	Total	205	466

WALES.

Counties.	Class 1.	Class 2.	Counties.	Class 1.	Class 2.
Anglesey . . .	..	..	Glamorgan . . .	1	1
Brecon	1	..	Merioneth . . .	2	..
Cardigan. . . .	1	1	Montgomery. . .	1	2
Carmarthen . . .	1	..	Pembroke . . .	1	1
Carnarvon . . .	1	1	Radnor	..	..
Denbigh	1	2			
Flint	2	5	Total . .	12	13

The recent Minute of the Committee, dated November 22, proposes that each school, aided by grants from the Committee of Council, shall be inspected once at least in every half year. The map will show their Lordships that the schools which are open to inspection are not always contiguous.

Number of schools which an inspector can visit every half year.

As day-schools are kept from 9 o'clock till 12, and from 2 o'clock till 5; two hours only will intervene (between the morning school and the afternoon school), which can be spent by the inspector in passing from one school to another in the same day.

When a school is small and humble in its character, three hours may suffice for its examination; but one day will be too short a period for the inspection of large and important schools, the character of which can only be ascertained by an analysis of the plan on which they are organized, and a review of each subject of instruction in each class, showing the skill of the monitor, pupil teacher, or assistant, to whose care it may be committed, as well as the attainments of the children.

In the majority of cases one day will be necessary for the examination of each school.

One day generally necessary for inspection of a school.

In many cases where less than one day will suffice, no school may lie sufficiently near for inspection in the same day.

In a minority of cases two small schools may, in consequence of their character and situation, be inspected in the same day.

In a minority of cases two schools may be examined in one day.

Most elementary schools are not open on Saturdays. The inspector will ascertain that during two months in the year, varying in different districts with the nature of the employments of the population, many schools are closed.

School holidays.

The inspection can therefore be conducted on five days in the week, and during five months in each half year.

Consequently the inspector will be able to devote (26 weeks — four = 22 weeks) 22 weeks of five days, or 110 days, in each half year to the examination of schools.

On 80 of these days he will be able to examine only one school.

On 30 days he may examine two.

He will thus examine 140 schools twice in the year.

One hundred and forty schools to be inspected each half year.

He will have one day in each week free, to collate such of his reports as he cannot prepare in the evenings of the preceding days, and one month in each half year unoccupied with the usual routine of inspection.

One of these months may be devoted to recreation.

The other month may be occupied with the preparation of General Reports, and with such special claims upon the time of the inspector as will arise out of the business of the preceding months.

Inspectors' districts described in a table of counties, and in a map.

The schools for which it is intended to provide periodical inspection being in number 665, may be distributed into five districts, each containing, on an average, 133 schools.

After a careful examination of the map, I submit to your Lordship that the inspector's districts should be arranged as is described in the following table, showing the counties included in each district, and the number of each class of schools in each county; the extent of each district is more clearly shown in the accompanying map, in which the outlines of the proposed districts are coloured.

	Counties.	Number of Schools to which Grants have been made by the Treasury, and the Trustees of which are willing to invite Inspection.	Number of Schools to which Grants have been made by the Committee of Council, on the condition of Inspection.	Total.
Northern.	NORTHERN DISTRICT:—			
	Northumberland	5	5	10
	Cumberland	.	2	2
	Durham	5	16	21
	Westmoreland	1	3	4
	Lancashire	27	39	66
	North Riding Yorkshire.	3	4	7
	East Riding ,,	5	5	10
	West Riding (part of) ,,	11	17	28
	Number of schools in Inspector's district	..	..	148
Midland.	MIDLAND DISTRICT:—			
	Part of West Riding	6	15	21
	Lincolnshire	5	11	16
	Nottinghamshire	3	5	8
	Derbyshire	3	11	14
	Staffordshire	7	17	24
	Salop	4	9	13
	Chester	9	17	26
	WALES.			
	Flint	2	5	7
	Denbigh	1	2	3
	Anglesea	..	..	..
	Carnarvon	1	1	2
	Merioneth	2	..	2
	Montgomery	1	2	3
	Total schools	..	..	139
Eastern.	EASTERN DISTRICT:—			
	Leicestershire	8	6	14
	Rutland	1	..	1
	Northampton	1	6	7
	Huntingdon	..	7	7
	Cambridge	2	7	9
	Norfolk	5	20	25
	Suffolk	6	15	21
	Essex	7	14	21
	Hertfordshire	3	12	15
	Bedford	5	9	14
	Buckingham	..	6	6
	Total schools	..	..	140

TABLE—*continued.*

Counties.	Number of Schools to which Grants have been made by the Treasury, and the Trustees of which are willing to invite Inspection.	Number of Schools to which Grants have been made by the Committee of Council, on the condition of Inspection.	Total.	
WESTERN DISTRICT :—				Western.
Worcester	2	4	6	
Hereford	2	2	4	
Gloucester	9	19	28	
Oxford	5	2	7	
Dorset	1	7	8	
Somerset	7	21	28	
Devon	6	13	19	
Cornwall	6	8	14	
Warwick	3	10	13	
Monmouth	2	2	4	
WALES.				
Cardigan	1	1	2	
Radnor	..	..	..	
Brecknock	1	..	1	
Pembroke	1	1	2	
Carmarthen	1	..	1	
Glamorgan	1	1	2	
Total schools	..	..	139	
SOUTHERN DISTRICT :—				Southern.
Middlesex	3	16	19	
Berkshire	3	7	10	
Hants	7	14	21	
Surrey	2	13	15	
Kent	4	14	18	
Sussex	6	18	24	
Wilts	7	16	23	
Total schools	..	..	130	

The districts being thus apportioned, I submit to your Lordship the mode in which the visitation of these schools by the inspectors should be regulated.

The mode of regulating the visits of the inspectors to schools.

Each inspector having nearly 140 schools apportioned to him to be inspected in five months of each half year, it may be convenient to divide his district into

Five Sections.

Each section should contain at least 12 schools; which, from their character and contiguity, may be inspected at the rate of two in the same day. Thus, in five months, 60 such schools would be inspected in 30 days; leaving 80 days (out of 110) for the inspection of the remaining 80 schools.

Five sections, containing each twenty-eight schools.

Five such sections having been apportioned on the map, the inspector should be directed to report in what months the school holidays of his

Each section to be inspected in a particular month

district occur, and which would be the most convenient month for the inspection of each section of his district.

The Lord President having this information, would then direct that each section be inspected in a particular month.

Inspector to give notice of day of examination.

Some weeks before commencing his tour of inspection in any section of his district, the inspector should prepare a scheme of his route in that section for the approval of the Lord President, and as soon as this route was sanctioned, he should give notice, by a circular, to the committee or trustees of each school, of the day on which he is directed to examine the school; of the time at which he will arrive, and the period he will devote to the inspection, requesting that as his time is apportioned to this duty in connection with other similar engagements, they will give notice to the master that the children may be duly assembled, and expressing his readiness to conduct the examination in the presence of the trustees or school committee.

It may be well, however, to intimate, that if the trustees or school committee desire to be present, the short period which can be devoted to the examination of the school renders a punctual attendance important, and the absence of all interruption necessary.

Form of circular to be prepared.

One general form of circular for this purpose should be prepared in the office, and printed by the Stationery department, the requisite number being issued to each inspector half yearly.

Future Apportionment of Districts.

Future apportionment of districts.

The grants of the Committee will annually increase the number of schools liable to inspection, and the trustees and school committees of many schools may, according to the terms of the instructions already issued to the inspectors, invite the inspection of their schools.

When number of schools increases.

Whenever such an invitation is given, the inspector should request that it may be made in writing, in a form sanctioned by the Committee of Council, and should then transmit the application to the Council Office to be recorded.

In this way the number of schools to be inspected in each district will increase, and unless sub-inspectors be appointed to assist the chief inspectors, a necessity will arise for contracting the area of the district, for readjusting the sections, and reorganizing the inspection from time to time; but this will be accomplished without any derangement of the general scheme of procedure, if the number of inspectors be proportionately increased.

Sub-inspectors to be employed at inferior salaries when number of schools increases.

As the number of schools liable to inspection increases, the propriety of appointing *Sub-Inspectors*, at inferior salaries, to be employed in the examination of the inferior order of schools, and likewise in the organization of schools, will probably suggest itself to their Lordships, as a means of maintaining an efficient periodical inspection, without a disproportionate increase of expense.

The importance of employing Sub-Inspectors for the organization of schools will, at no distant period, probably be brought under the consideration of the Committee, by the urgent need of such aid experienced in the country, and by the strong sense of the importance of providing this assistance, entertained by some of the most influential prelates, and by the Committees of societies not connected with the church.

Reports.

The Reports of the Inspectors will be of two kinds,—

1. Special.
2. General.

1. Special.

1. The special Reports will contain answers to the form of questions appended to the instructions to Inspectors of Schools, together with such a description as each Inspector may think it convenient to give, in more general terms, of the condition of each school at each visit.

The form of these Special Reports will, in a periodical inspection, be less comprehensive, after the first visit, than on the inspection which has hitherto occurred at long intervals.

At a *primary visit* the Inspector will procure replies to the entire series of inquiries now used; but, after the first examination of the school, it will only be necessary to ascertain and record the changes which have occurred in the *general features of the school*, and special attention will be given to the series of questions which relate to the organization, discipline, and state of the instruction.

Primary and secondary series of questions.

The usual series of questions should, therefore, for the purposes of a periodical inspection, be divided into two classes,—

1. Primary.
2. Secondary.

The results of the *primary and secondary* inquiries should be recorded in forms, contained in a book or portfolio, giving at one view the condition of the school at successive visits, both as respects its general features, and the condition of the discipline and instruction.

Portfolio for each section.

If such a book or portfolio were kept for *each section*, it might be transmitted to the office at the end of *each month*, for the information of the Committee of Council, copied, and returned to the Inspector.

Send to the office at the end of the month's inspection, with memoranda, for use of school committees.

The Inspector would transmit, at the same time, or, in particular cases, at an earlier period, such remarks and recommendations suggested by his visit to each school, *in separate Memoranda*, as he might wish the Committee of Council to convey to the Trustees or School Committee, for their information, and as suggestions for the improvement of the school.

These Memoranda, having been submitted to the Lord President, would, as far as they were approved, be communicated officially to the Trustees, or School Committee, by the Secretary.

General reports.

Besides the *Special Reports* recorded in the forms comprised in the book or portfolio of each section, each Inspector will half-yearly present a *General Report*, conveying to the Committee such general views and reflections as may be suggested by his labours, and containing the classified results of his tour of inspection.

Special inquiries.

Special inquiries may also occasionally be required for the information of the Committee of Council, or in consequence of suggestions conveyed to the Lord President from without.

To be undertaken only by direction of Lord President.

No such inquiries will, however, be undertaken, otherwise than by the direction of the Lord President, nor any reports made, excepting to the Committee of Council on Education.

Church of England Schools.

Four or five additional Inspectors will be required for the examination of Church of England Schools.

British Schools.

British schools.

The number of British schools liable to inspection in England and Wales does not exceed seventy-eight; and one Inspector may examine these schools, and the Normal and Model Schools in the Borough-Road, twice in the year. The British Schools have not hitherto generally invited the visits of the Inspectors.

Normal Schools.

Besides the periodical inspection of elementary schools, it will be necessary to provide for the periodical inspection of the Normal Schools of the Church of England which have been aided by public grants, and of the Normal and Model Schools in the Borough-Road.

Mode of inspecting Normal Schools.

Many considerations are involved in this important subject, and the Inspectors have not hitherto received any instructions from your Lordship as to the mode of conducting the examination of Normal Schools. On the course to be pursued by them, nevertheless, depends the estimate of the extent of duty for which it is necessary to provide. For these reasons it has appeared to me expedient to submit to your Lordship the view I take of the mode of conducting the inspection of Normal Schools, as suggested by my own experience in directing and visiting such establishments.

Inspection is ameliorative, not corrective.

I apprehend that the Committee, when they issue directions to their Inspectors for their guidance in the examination of Normal Schools, will repeat in emphatic terms the injunctions contained in their instructions respecting the inspection of elementary schools, viz., "that this inspection is not intended as a means of exercising control, but of affording assistance; that it is not to be regarded as operating for the restraint of local efforts, but for their encouragement; and that its chief objects will not be attained without the co-operation of the School Committee (or Boards of Direction), the Inspector having no power to interfere, and not being instructed to offer any advice or information, excepting where it is invited."

Impartiality to be reconciled with encouragement.

The inspection of Normal Schools, as well as of Elementary Schools, is intended to be *ameliorative*. The efforts of the Inspectors will therefore be directed to combine impartiality in their proceedings and reports, with encouragement to the promoters of elementary education.

In order to reconcile the necessary impartiality with the ameliorative tendency of inspection, several considerations suggest themselves under the following division of subjects of inquiry.

1. The intellectual acquirements of the pupils of Normal Schools.
2. The moral condition of such establishments.
3. The religious condition.

Intellectual condition.

Under the first of these heads a preliminary question arises respecting the mode in which the intellectual acquirements of the pupils may be most satisfactorily examined.

The Inspector will, in the first place, make himself acquainted with the method which each master in the Normal School pursues, in imparting instruction to his class, on each of the subjects which he teaches. For this purpose the Inspector will attend one of the usual lessons of the class.

He will then request the master to give him a written sketch of the course of instruction through which the class has passed.

Oral examination and trial in exposition.

It may be desirable that an oral examination of the class should follow; and that the power which the pupils have acquired of *exposition* on the subject of instruction should be tested.

Examination by written questions,

To these preliminary inquiries should succeed an examination by written questions prepared by the Inspector, without conference with the principal or master, and delivered by himself personally to the class, at the time when his examination on that subject commences. The replies to these questions should be written in the presence of the Inspector, without any assistance from books or papers, or from any other source, and these replies should afterwards be carefully examined and tabularized.

in the presence of the inspector, without aid.

In examining the replies to the questions, it may be desirable that the Inspector should request the assistance of the master of the class, who may afford explanations concerning the methods employed, the age, character, and peculiarities of the pupil, enabling the Inspector to form a more just estimate, than he would be otherwise able to do, of the influence of the school on the intellectual progress of each pupil.

In examining answers, Inspector may consult professor.

Before preparing such questions, as well as during the examination of the replies, the Inspector should avail himself of every opportunity of acquiring information respecting the nature and extent of each pupil's attainments upon his admission into the school, and on the degree of ability he has displayed on the course of study through which he has passed, lest he be led to require from pupils of this class a proficiency and an extent of information which could only legitimately be demanded from students whose minds have been subjected to a more regular and gradual training, and who, besides having passed through a complete course of education, have, during their entire lives, been in the care of well-educated parents, or in the society of well-instructed people.

Should make careful inquiry concerning capacity, character and history of each pupil.

The state of a Normal School at the period of inspection is liable to be affected by various circumstances, the enumeration of which may tend to show the caution which should be observed in attempting to form an estimate of its efficiency.

State of School fluctuates.

In most of these establishments the average time that the adult pupils will at present be able to remain under training will not exceed one year and a half. The periods of admission and departure will be certain, and, until the number of candidates for admission is in excess cannot always be so regulated as to ensure a regular supply of pupils fixed and convenient periods.

The number of pupils in the schools will therefore fluctuate, departure of one-third, or a greater proportion, of the most and skilful pupils, and the admission of a similar number of raw recruits may occur immediately before the visit of the Inspector.

Under such circumstances, the Inspector should bear in mind some of those who remain in the higher classes of the Normal probably continue there only because they had not sufficient energy, or industry, to secure a more prominent position, and to appointments as masters of elementary schools. The most pupils, at such periods, will be those whose instruction has cost largest amount of labour and skill, with the least fruit, owing to sterility of their minds.

Such pupils no test of efficiency of masters and methods.

To determine the skill of the masters, the efficiency of their methods, and their capacity for their duties, from the attainments of such pupils, (if regarded as average specimens of their class,) would be to judge the masters by too severe a standard, and to commit a grave practical injustice.

An annual examination of Normal Schools insufficient.

One annual examination of a Normal School will be found insufficient to enable an Inspector to speak with confidence concerning the intellectual attainments of the pupils, and if he were to report the results of one examination only, he might place on record either the highest range of attainments ever acquired in the school, (and thus exceed the average,) or he might report the lowest of those fluctuations to which such establishments are subject.

Difficulties and casualties of such schools.

If the foregoing considerations failed to show how important it is that the inspection of such schools should occur more frequently than once in each year, it must be remembered that the progress of the pupils may be interfered with at particular periods by various casualties. One or more of the masters may have suffered from illness, and the funds of the establishment may have been unable to sustain the burthen of subsidiary aid; or a master may have been removed, and great difficulty may have been experienced, and much time lost, in securing a successor.

Among other casualties causing a considerable fluctuation in the attainments of pupils in such schools, are the temporary claims of peculiar duties. Owing to the loss of a great number of pupils of the superior class, the rest may have been employed for some months, at least double the usual daily period, in taking charge of the Model School. Such an interruption of their technical studies would be attended with the compensatory advantage of an increase in their knowledge of school discipline and management, and of their skill as teachers, but would cause a loss of expertness, precision, and accuracy, in their written replies to the examination papers, which would probably be augmented by a want of self-possession, arising from a consciousness that their attention had not, for a considerable period, been directed to the subjects of examination.

In such examinations it should likewise always be borne in mind, that until Normal Schools are rendered entirely independent of the contributions of the pupils, or of their patrons, (which is perhaps undesirable,) pupils will not be selected on account of talent or proficiency, and etimes will be admitted even with imperfect moral qualifications. generally enter such schools with no acquirement beyond reading, , and the four most simple rules of arithmetic; and often they her read nor write fluently, nor perform a sum in simple addition This state of the pupil's attainments, on their entrance, must nue to be a source of great embarrassment to such schools, until the ntary education of the country is generally improved. But, to the ctions arising from this source, must be added the incapacity of f the pupils, and the slowness with which their untutored minds the influences of education, and develop powers which had been t from inactivity and neglect. One-third of the pupils will gene- found to belong to the first of these classes, and both classes omprise one-half the school.

s the causes of fluctuation might affect a large portion of the pupils a Normal School at particular periods, so they must, at all times,

more or less affect the state of the attainments of individuals in such schools, and will be most conspicuous in those whose attainments are low at their entrance, and whose faculties are feeble.

The several causes of fluctuation may be accumulated.

It may happen that all the causes of fluctuation in the attainments of the pupils may be accumulated at the same period, and in such case the Inspector ought to know, and to confess, that he is ascertaining and recording the *lowest fluctuation* of which such a school is susceptible.

Inspector should visit Normal Schools twice in each year.

These general considerations are sufficient to show that it is important the Inspector should visit a Normal School at least twice in each year; and that though he may report his examination papers, and their tabularized results, at the close of the first examination, he should not make the *general report*, containing his opinion of the condition of the establishment, until he has made a second examination.

General report annually presented.

Such a second examination will enable him to determine the progress which each pupil has made in the interval, and thus to test the efficiency of the means of instruction provided.

After second examination.

In Normal Schools, therefore, I recommend that there be two examinations in each year, and that the Inspector present his *general report* on the school after the second of these examinations.

2. *Moral Condition.*

Moral condition of Normal Schools.

It will be found that in investigating the *moral condition* of a Normal School, considerations of a different nature present themselves, suggesting the same conclusions.

Frequent intercourse with masters necessary.

To ascertain the moral state of such a school, it is necessary that the Inspector should have considerable intercourse with the masters, so that he may form a just opinion of their characters, opinions, and mode of establishing influence over their pupils.

He will of course communicate fully with the Principal on all subjects affecting the moral well-being of the household.

Inspection. Domestic arrangements.

He will ascertain what are the domestic arrangements in the dormitories; the superintendence under which the pupils retire to rest and rise in the morning; what vigilance is exercised during the night, and the degree of decorum preserved.

He will ascertain whether the diet is so simple,—whether the household arrangements are so divested of all luxury,—and whether the domestic duties performed by the students are such as to prepare them for the humble position and probable privations of a schoolmaster's life, and to prevent the growth of presumption and conceit.

Domestic work

For this purpose he will inquire under what superintendence domestic work is performed, and the order of the household preserved.

Cultivation of garden.

He will observe with what degree of skill and order the garden is cultivated; whether the property of the establishment is respected by the pupils, and the general signs of cleanliness of the apartments, if they are under the charge of the pupils.

Frequent interviews with pupils to ascertain manners and habits.

He can only ascertain by frequent interviews with the pupils, during the daily routine of their duties; whether they are punctual, orderly, industrious; respectful in their demeanour to their superiors; subordinate to those of their own number, who may be placed in offices of trust and superintendence; gentle in their intercourse with each other; whether the mode in which they employ their leisure indicates mental activity; and whether their habits of thought, and the nature of their

conversation give assurance of an open, truthful, and generous disposition, which promise a thoughtful and serious tone of mind in after-life.

The Inspector cannot ascertain the state of the manners and habits of the pupils, unless, by familiar visits, he has some means of becoming acquainted with the domestic history of the establishment.

For this purpose, therefore, something more than one annual visit of inspection is necessary.

3. *Religious Condition.*

Religious condition of Normal Schools

Much less can the Inspector, from one visit, form any correct opinion of the serious matters which are included in the general term, the religious condition of a Normal School.

Daily religious exercises of household.

He will ascertain what are the daily religious exercises of the establishment; and he should attend them, to know in what manner they are conducted. He will thus be enabled to observe the degree of attention paid by the pupils to their general and formal religious duties.

Influence of religion on personal conduct.

His examinations will make him acquainted with the state of their religious knowledge, but it is of much more importance that he should observe the daily habits of the household. He should ascertain what attention is paid to personal religious duties: what means exist for private religious counsel, and how far they are sought and enjoyed. He should endeavour to form a just estimate of the influence of religion on the conduct of the pupils by personal observation and inquiry.

Annual Report to be the result of frequent visits.

This it will be impossible to do by an annual visit, and the paramount importance of these latter inquiries, displays the necessity there is for rendering the *Annual Report* of an Inspector on a Normal School the result, *not of one*, but of *several visits of inspection*, at convenient periods, scattered over the surface of the year.

Estimate of the Time required for the Inspection of the Normal Schools which are liable to Inspection.

Formal inspection to occur once every half year.

These general views suggest that the inspection of each Normal School should be conducted half yearly, and that the Inspector should visit occasionally in the intervals of his examination.

Subjects of examination.

The subjects of examination will comprise—

1. Religious Knowledge, including
   - A. Biblical Instruction;
   - B. Liturgical, in Schools connected with the Church of England;
   - C. History of Christianity.
2. Reading and Writing.
3. Arithmetic and Algebra.
4. English Grammar and Etymology.
5. Geography.
6. Singing.
7. Mensuration of Planes and Solids.
8. Elements of Mechanics; Theory of Steam Engine and of Natural Phenomena.
9. English History.
10. Linear Drawing from Models.

11. Gymnastics.
12. Horticulture.
13. School Discipline and Management.
14. The Art of Governing and Instructing a Class of Children in an Elementary School.

These subjects are taught in all the existing Normal Schools which have been aided by public grants.

Each Normal School, when in full activity, will contain from 50 to 70 students.

On each subject three, if not four, classes of students will have to be examined.

The examination papers alone will, therefore, probably occupy eight days of four hours each, all the classes being assembled in one hall, to work their papers simultaneously.

Eight days' examination papers.

While this work is proceeding the Inspector will be able to prepare other forms of questions, and to examine papers written on previous days.

The oral examination of classes, and the expository trials, will occupy at least two days; and the inspection of the Model School, together with the trials of the students in the management and instruction of classes in the presence of the Inspector, probably four days.

Oral examination and trials of exposition, two days; Model School, &c., four days.

Fourteen days will thus be occupied in the examination of intellectual progress.

To minutely inspect the papers prepared by each student, and to tabularize the results after communication with the masters, as well as to prepare a general report, will occupy a large portion of the remaining ten days of a month of active and persevering employment.

One month altogether will be required for inspection of one Normal School.

When the scheme of instruction comprises all the subjects I have enumerated, and the school contains from 50 to 70 students, one month will be required to examine and record the intellectual state of a Normal School, and to form an accurate opinion on its moral and religious condition.

Three months must be so expended every half year in the inspection of—

Three months every half year for three Normal Schools.

St. Mark's College,
The Battersea Schools,
The Chester Diocesan Schools,

or six months annually. But if, in any of these schools, the scheme of instruction is more limited, or the number of students smaller, the inspection may be completed in a proportionately shorter period. These six months will be employed in work of so laborious a character, that it may be desirable that this employment should alternate with those casual and general inquiries which the Committee of Council will have to undertake, or with the inspection of some smaller district containing elementary schools.

I should therefore propose that such casual and general inquiries, or such smaller district, should be confided to the Inspector of Normal Schools.

Casual and general inquiries to be made by same Inspector.

Five additional Inspectors of schools in connexion with the Church of England, and one of British schools required.

On the foregoing grounds I submit to your Lordship the importance of appointing four additional Inspectors of Elementary Schools in connexion with the Church of England and one Inspector of Normal Schools, and that the vacancy occasioned by the promotion of Mr. Tremenheere

should also be filled up by the appointment of a new Inspector of British schools.

Salaries not to be reduced.

Considering the great importance of the duties which have to be performed, I do not think the salaries ought to be reduced, as has been suggested.

The success of the labours of the Inspectors will be greatly promoted by their conciliating the support and assistance of the gentry and clergy, and the Inspectors who have charge of large districts should have enjoyed an university education, and be men of extensive acquirements and good manners.

Sub inspectors.

In the course of time it may be easy to place under them, in subordinate situations, a class of officers with inferior salaries.

New distribution of salary.

Though, for these reasons, I think the salary should not be reduced, I am of opinion that it may be given in a somewhat different form with advantage.

I submit to your Lordship that the salary of each Inspector should be 450*l.* per annum, with an allowance of 15*s.* per diem, *for personal expenses, while employed in the business of inspection in his district*, and that the actual expenses of locomotion should be defrayed by Government.

Progressive increase of salary for length of service proposed.

The business of inspection requires peculiar knowledge, tact, and skill, which can only be gradually acquired, and which few of the Inspectors will possess when they enter on the discharge of their duties. It is important that they should not regard their office as a mere step towards promotion, but that they should seek it as a profession to which they are willing to devote their lives. Otherwise, as soon as an Inspector had acquired the requisite knowledge and skill, he would either obtain promotion or retire in disgust, or, missing the rewards of activity and zeal, would regard his duties as a necessary drudgery, and perform them without energy or skill.

On this account I think it important that length of service should obtain progressive rewards.

I have the honour to be, my Lord,

Your obedient servant,

J. P. Kay Shuttleworth.

The Lord President of the Council.

REPORT ON THE ENDOWED SCHOOL AT YAXLEY, HUNTINGDONSHIRE,

By the Rev. JOHN ALLEN, M.A., Her Majesty's Inspector of Schools.

MY LORD, King's College, London, February 9, 1843.

THE Vicar of Yaxley having represented to me during my late tour in Huntingdonshire, the extreme dissatisfaction felt by his parishioners with reference to the state of the endowed school in that town, I was induced to communicate with the Right Honourable the Earl Brownlow, sole trustee of Yaxley school, on the subject; and having been requested by his Lordship to make a special report of its condition, I sent a notice to the master through the clergyman, of my intention to inspect the school on the morning of the 10th of October last.

The town of Yaxley lies about two miles north of Stilton; its population is 1,211, all of whom, with the exception of the inhabitants of two or three houses, are collected round the school, which is conveniently situated in the main street.

State of School.

Upon entering the school-room, I found assembled 15 boys; of these seven were reading a chapter in the New Testament, the rest were sitting at a desk without any means of employing their time. On examining the acquirements of the children, I found only three who were able to read a simple verse of the New Testament without blundering, eight would read easy words with different degrees of success, and four were not advanced beyond the alphabet. The ages of the children varied from five to eleven. On inquiring farther, how long the last four had been under tuition, I found that one had been a year in the school, one half that time, one a month, and one was supposed to be deficient in intellect. Reading is taught from the New Testament, and a few of the sheet lessons of the British and Foreign School Society. Only one boy was learning arithmetic. Three wrote on paper, the rest did not use slates. The school is not opened nor closed with prayer. A few of the children attend church on the Sunday.

Notice of the Master.

No reasonable hope can, as I fear, be entertained of any considerable improvement in this lamentable condition of things, so long as the present master retains his office. It is difficult to believe that any amount of instruction, however small, is communicated by him to his scholars; those farthest advanced had been taught elsewhere. His inefficiency arises not simply from

his want of capacity and training for his work, but is due also to his irregular attendance at the school. He lives at a distance on a farm which he cultivates, and having some employment also in measuring land, and in assisting the parish officers to make up their accounts, there are, as I am informed, many school hours in which no traces are to be found of school keeping, other than a few dirty children sprawling on the floor. On the first day of my visit, having sent no notice, although the time was one at which the school should have been open, the door was locked, and the master nowhere to be found. Apart from this dishonesty of receiving wages for the performance of work which he neglects, he was represented to me as of respectable character, and his manners are gentle. He began school-keeping more than 20 years ago, at the age of 36. He was at first engaged as assistant to his relative, the late schoolmaster, and in 1830, on the continued absence of the nominal master, he received the appointment during pleasure.

Endowment.

The master's name is Hanson Hatfield; he occupies some premises in Yaxley, belonging to the charity, valued at 43*l.* 3*s.* 6*d.*, from which 4*l.* 10*s.* must be deducted for the rent of three cottages, which having been repaired by the parish, are now tenanted by paupers free of charge; he has also a salary of 30*l.* Lord Brownlow's agent pays in addition an annual sum of 21*l.* for the salary of the mistress of a girls' school in Yaxley, which is also supplied with books.

These funds arise out of lands left for the endowment of Yaxley school, in the parishes of Yaxley and Tylney. The land in Yaxley parish, not occupied by the schoolmaster, is somewhat more than 15 acres in extent, its annual rent being 23*l.* 8*s.* There are 34 acres in the parish of Tylney in the county of Norfolk, from which the rent at present received is 42*l.* The vicar of Yaxley informs me that these lands are considerably underlet, and that they have been lately valued by Lord Brownlow's agent at 60*l.* per annum.

The school-room was erected about 12 years since. It is of brick with a slated roof, and a brick floor. Its area is 16 feet by 36, the height of the wall nine feet. It is in indifferent repair, and not sufficiently warm in winter. It is fitted up at one end with three desks and benches arranged according to Lancaster's plan. The master's residence is built in a great measure of wood; it is very old and much out of repair.

In my Report of Schools inspected in Derbyshire, I felt called upon to submit to your Lordship's notice several lamentable cases of the misappropriation and consequent inefficiency of funds left for the endowment of schools. I regret to state that, in proportion as my experience is enlarged, I feel more and more strongly the need of some efficient remedy for the present con-

dition of things in this respect. Two instances that have recently come under my notice your Lordships will perhaps allow me very briefly to specify.

Farcet Endowed School.

At Farcet, the parish adjoining Yaxley, there is a schoolmaster's residence, with an endowment arising from 11 acres of land in value, as I was informed, of 23*l.* per annum. On the day of my visit there were assembled in a low room, 11 × 15½ feet in area, six boys and one girl. The master was formerly employed as an excise officer, but was discharged on account of a breach of trust: he began school-keeping without any training at the age of 42. There were nominally 12 boys on the foundation; of these, two were present. Only one child was learning arithmetic, and he, on being tried with an easy sum in Simple Addition, was unable to find the total of three figures. One of the children who was reading words of three and four letters had been in attendance at the school a year and a half.

Lichfield Free School.

In the Free Grammar School at Lichfield, the master of which is unhappily a clergyman, the premises being valued at 50*l.*, the whole value of the situation was for some years 129*l.* 14*s.* 4*d.* As during the last seven years no boys have received instruction at the school, a gratuity of 35*l.*, formerly paid by the feoffees of the Conduit lands, has been recently withheld under protest from the master. The decay of this school seems mainly attributable to the violent conduct of the master. His treatment of two boys, on two separate occasions, subjected his modes of punishment to investigation before the magistrates, one boy having been subsequently confined to his bed under surgical advice for a fortnight.

Need for inspecting Endowed Schools.

It is not intended, when the circumstances of an endowed school are brought forward as requiring amendment, to attach in all cases special blame, either to the master or to the trustees, or to any particular class of persons. But, from various causes, there has been, in many instances, great neglect. And the question arises, ought not something more to be done to carry out the intentions of the founders? Would not the masters feel themselves encouraged to exertion and assisted in their work if they were subject to the periodical visits of a duly qualified inspector, who might not only have it in his power to communicate information as to what was being done elsewhere in a similar position, but who ought also to sympathise with and appreciate their efforts in the right direction, and the recurrence of whose examinations could scarcely fail of proving a stimulus to the pupils? Is it not probable, also, that there would be some cases where the trustees

would prove more anxious about the discharge of their duty if they were aware that the manner in which they met their responsibilities was liable, in some measure, to be made public? Or, is it sufficient that these should have the power of saying what has been said to me in cases where the quality of the instruction given was very indifferent, "The school satisfies us, and we do not wish that it should be inspected."

The feelings that I have expressed, of its being needful that something should effectively be done for the remedy of the present condition of endowed schools, are shared by every seriously-minded person who has had experience on the subject, and with whom I have had the means of conversing; and particularly with regard to the clergy, to whose exertions what is being done in the rural districts in the way of right education is at present mainly due, I am assured that they would gladly hail a general system of inspection from a rightly-qualified officer; and that they look, with anxious expectation, for some sanatory measure by which a state of things, such as I have been describing, can be effectively and rightly met.

My Lords, I am, with much respect,
Your Lordships' obliged and faithful servant,
(Signed) JOHN ALLEN.

NOTE.—Since this Report was presented, I have been informed by Lord Brownlow's agent, that the Yaxley Charity estates are now let under improved rents, in consequence of the survey and valuation made in March, 1838: 15 acres in Yaxley, at £23. 8*s*, and 28 acres in Tilney, £56: and that these rents are high enough; also that there is an accumulation of funds in favour of the Charity amounting to nearly £100.

SECOND REPORT ON SCHOOLS INSPECTED IN DERBYSHIRE,

By the Rev. JOHN ALLEN, Her Majesty's Inspector of Schools.

MY LORDS, King's College, London, March 22, 1843.

I HAVE the honour to present to your Lordships the second and concluding portion of my Report of Schools inspected in Derbyshire.

From consideration of the circumstances under which the inspection was carried on, it did not appear to me requisite to visit every parish. Attention was in the first instance directed to those places from which invitations to inspect had been received through the Archdeacon; subsequently (on experiencing the great kindness with which the visits of an Inspector were generally welcomed by the clergy, and the anxious desire expressed by them to follow out any plans that would tend to render their schools more efficient) my sphere of inspection was enlarged; and although I cannot from actual observation present a complete report of all schools in the county of Derby connected with the Church of England, I have reason to believe that with two or three exceptions in the neighbourhood of Chesterfield, and those in the parishes of Hartshorne and Longford, there are few schools of importance in which the clergy take a strong practical interest which I have omitted to visit.

Before I enter upon the results of my inquiries I would wish to repeat in this Report the expression of my gratitude to the clergy for the personal obligations and great hospitality received from them in the prosecution of my work. Their behaviour was such as not only to offer every facility for carrying on the inspection, but also to render my sojourn in the district as agreeable as possible to myself.

Exclusive of those assembled on the Sunday, the whole number of schools visited in Derbyshire (counting each room under a separate teacher) is 184; of these 108 were schools under a master, 62 were schools under a mistress, 14 were infant-schools fitted with galleries, also under mistresses. The number of children that I found in attendance at these was in all about 7,540. The proportion of girls to boys being somewhat more than 3 to 5.

Most of these schools were so inspected as that each child (with the exception of those assembled in the infant-schools) came separately under examination. Some of the facts ascertained since the last Report are given in the following tables:—

	Numbers present on the day of my visit.		Reading.				Writing.				Arithmetic.			
			Unable to read words of two Syllables.		Able to Read with ease.		On Slates only.		On Paper.		Learning first Four Rules.		In Compound Rules.	
	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.
Schools in which Boys and Girls are taught in														
Brailsford . . .	29	30	1	..	21	24	10	10	19	20	..	18	9	..
Dailey Dale . . .	28	23	5	2	6	9	15	8	13	15	6	15	..	..
Derby (Lancasterian)	179	83	61	25	73	31	119	66	60	17	80	31	17	5
Horsley	35	39	11	8	8	11	26	..	9	13	5	10	1	2
Kirk Ireton . . .	22	23	12	4	8	11	..	..	9	9	4	1	2	..
Kirk Langley . .	36	25	..	..	23	22	..	..	28	17	2	2	5	5
Shardlow Workhouse	24	29	..	..	24	11	..	Children		8	not		fully	
Spondon	68	35	14	..	19	20	31	22	37	13	14	13	37	..
Stapenhill . . .	44	21	4	..	18	15	23	5	21	16	15	15	4	1
Sudbury	47	43	8	10	22	24	15	9	27	17	12	32	6	6
Schools under														
Ashover* . . .	45	12	8	..	14	7	13	..	28	6	9	..	6	4
Aston	34	..	5	..	5	..	8	..	11	..	11	..	..	..
Blackwell . . .	22	4	..	..	9	3	..	..	22	4	11	1	2	3
Bolsover	20	7	..	..	16	7	..	..	20	7	3	2	6	..
Bradborne[a] . . .	10	8	..	..	9	..	..	..	7	4	..	..	..	..
Brampton . . .	23	2	9	..	13	..	..	..	18	1	5	..	2	..
Brampton (Endowed)	7	..	..	..	4	..	..	..	..	..	..	..	..	..
Brampton Moor, St. Thomas.	39	19	12	4	10	7	10	..	19	9	12	6	4	..
Bunnington . . .	22	20	4	3	8	9	10	9	12	11	10	8	3	3
Church Broughton .	14	10	Children only				asked		a	few	questions.			
Chaddesden† . .	22	7	..	..	7	2	10	7	8	..	6	3	..	..
Clown	10	4	4	..	1	2	..	..	3	1	1	..	..	..
Deerleap	30	6	4	1	15	4	..	..	24	4	3	1	8	..
Doveridge . . .	43	14	5	1	22	7	..	..	27	12	12	7	6	1
Dronfield . . .	35	..	10	..	14	..	15	..	15	..	10	..	4	..
Duckmanton. . .	27	9	9	2	12	4	..	..	15	3	3	1	..	..
Duffield (Endowed).	25	..	1	..	17	..	..	..	21	..	4	..	6	..
Eckington . . .	94	1	15	..	33	1	..	..	61	1	14	1	15	..
Edengale* . . .	25	11	7	3	4	8	8	2	10	9	6	8	3	..
Eyam*	36	7	7	..	13	6	12	1	12	6	4	2	2	..
Findern	48	10	6	4	21	5	..	..	35	5	11	2	6	..
Great Longstone .	37	8	1	1	20	4	1	..	29	6	14	5	8	1
Hardwick in Hault Hucknell.	23	8	2	..	5	..	..	..	15	8	..	1	3	2

(a) Master educated

NOTE.—The letters α, β, γ show the relative degree of attention that was apparently paid which impressed me most, and γ those which

In Proportion and Higher Rules. B.	In Proportion and Higher Rules. G.	Cleanliness of Children.	Intelligence of Children.	Training of Teacher.	Amount of Endowment. £. s. d.	Amount of Subscriptions £. s. d.	Salary of Teacher. £. s. d.	Dimensions of School room in Feet.
SEPARATE ROOMS UNDER A MASTER AND MISTRESS.								
1	2	β α	β α	..	..	..	..	25×17
1	..	α	β α	..	27 13 2	15 0 0	22 10 0 and pence	30×20 each
6	..	β α	β α	..	..	122 16 6	100 0 0	25×70 and
							45 0 0	20×60
2	..	β α	γ β	*	..	37 0 0	35 0 0	40×20
							25 0 0	
..	1	β	β	..	..	..	..	14½×27
8	..	α	β	..	20 0 0	..	20 0 0 and pence	20×15½
								16×30
		Boys.						
examined.		α	α	..	..	..	..	a 19½×16¾
..	..	α	β	*	13 0 0	38 0 0	40 0 0	20×40 and
							30 0 0	20×30
6	..	α	..	..	..	..	60 0 0	30×18 and
							20 0 0	26×18
14	..	α	α	..	Expenses	defrayed by	Lord Vernon.	38¾×15½
								40×30
A MASTER.								
								15×30
2	..	β	β	..	21 9 0	..	..	21×17
2	..	α	γ	..	..	..	..	..
8	..	β	γ	..	..	..	..	26½×14¾
5	..	β	β	..	3 0 0	..	53 0 0	12×12⅔
..	..	..	..	..	..	..	..	..
							28 0 0	
6	..	β	β	..	..	..	..	..
..	..	γ	γ	..	10 18 0	..	..	..
..	..	α	β	..	..	..	..	..
							35 0 0	35×17
..	..	β	α	..	..	..	..	..
..	..	γ	γ	..	30 0 0	..	..	34⅔×13½
1	..	β	α	*	3 4 0	20 0 0	33 0 0	30×15
..	..	γ	γ	..	17 0 0	..	..	24⅔×14
6	6	β	β	..	..	..	..	24⅔×17
4	..	α	β	..	..	..	..	41×20
2	..	γ	γ	..	208 7 0	..	130 0 0	15×33
..	..	β	β	..	18 0 0	..	..	16⅔×19½
5	..	β	β	..	124 10 0	..	..	30×54
20	..	α	β	..	100 0 0	..	140 0 0	14½×25
..	1	β	β	..	..	..	..	36½×15½
..	..	β	γ	*	19 0 0	..	44 0 0	24×12¾
5	..	β	β	..	55 0 0	..	67 0 0	27×16
8	..	α	α	(a)	14 13 0	..	..	..
2	2	α	β	..	28 0 0	..	..	

at Christ's Hospital.
to the cleanliness and intelligence of the children; the letter α marking those cases impressed me least favourably in these respects.

	Numbers present on the day of my visit.		Reading.				Writing.				Arithmetic.			
			Unable to read words of two Syllables		Able to Read with ease		On Slates only.		On Paper.		Learning first Four Rules		In Compound Rules.	
	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.	B.	G.
Schools under a														
Hartington	21	3	..	..	12	3	..	..	19	3	5	1	1	..
Heage	45	6	15	1	3	1	..	..	29	5	9	1	3	..
Heath[w]	17	13	4	3	7	6	..	..	8	3	2	1	1	..
Hilton	14	3	4	2	8	..	..	..	9	..	2	..	1	..
Hognaston	12	4	2	1	3	4	..	..	6	4	2	..	2	1
Holmesfield	32	11	..	..	14	5	..	..	16	6	2	..	4	..
Killamarsh	33	2	8	..	3	..	..	..	11	..	1	..	2	..
Mackworth	33	..	8	..	15	..	..	..	21	..	3	..	4	..
Mickleover	18	4	4	1	2	..	3	..	5	3	1	..	..	1
Monyash	13	9	2	..	1	7	3	1	7	8	1	2	..	..
Norbury	33	14	6	..	9	10	6	3	15	11	12	5	3	4
North Wingfield	33	12	Children not fully examined.				..	..	18	5	1	4	1	..
Newbold	29	20	9	6	8	4	..	..	13	11	5	1	..	1
Ockbrook	65	..	6	..	25	..	9	6	56	..	34	..	7	..
Parwich, Day School	28	11	..	..	25	9	..	..	20	5	6	2	2	1
,, Sunday School	10	9	..	..	..	..	..	..	..	..	..	..	..	..
Risley	100	6	4	..	48	6	..	..	62	6	18	6	8	..
Scropton	19	9	5	3	5	2	1	..	7	3	..	2	2	..
Shardlow	51	..	..	..	32	..	9	..	42	..	20	..	14	..
Shirland*	33	16	6	..	11	14	..	..	25	15	9	6	2	1
Shirley	23	..	4	..	11	..	5	..	11	..	..	..	4	..
Shottle	17	14	6	2	8	5	9	9	8	5	2	..	2	2
Smalley	41	..	4	..	16	..	..	..	36	..	7	..	2	..
Stony Middleton	22	5	5	..	3	3	5	4	12	1	4	..	6	..
South Normanton	23	17	7	4	8	7	8	3	7	7	2	..	1	1
South Wingfield	19	13	4	5	6	5	..	..	10	8	3	..	2	..
Tibshelf	8	2	1	..	5	1	..	..	8	2	2	..	1	..
Tickenhall	61	3	2	..	15	2	..	..	34	3	17	1	4	1
Tirsington	21	1	8	..	9	1	..	..	9	1	1	..	7	..
Unston	30	31	11	11	7	6	..	..	11	8	5	4	3	2
Walton on Trent	13	22	..	1	6	12	3	1	7	13	12	21	1	1
West Hallam	64	3	7	..	25	3	..	..	48	3	9	..	9	..
Schools under														
Allestree (Boys')	32	..	4	..	16	..	12	..	..	..	..	..	..	..
,, (Girls')	..	25	..	1	..	14	..	6	..	..	..	..	..	..
,, (Infants')	11	15	11	11	..	..	..	..	..	..	..	..	..	..
Barrow	11	5	7	..	2	5	..	..	2	5	3	2	..	..
Carsington	8	9	3	2	1	1	..	..	6	5	..	..	..	..
Donisthorpe	9	14	..	..	1	5	7	8	2	6	3	5	..	..
Doveridge	..	26	..	..	..	14	..	11	..	15	..	12	..	1
Dronfield	4	72	4	8	..	29	..	37	..	27	..	39	..	6
Duffield	36	42	14	15	11	12	23	24	6	5	14	14	..	..
Eckington	..	46	..	5	..	19	..	31	..	15	..	38	..	3

In Proportion and Higher Rules. B.	In Proportion and Higher Rules. G.	Cleanliness of Children.	Intelligence of Children.	Training of Teacher.	Amount of Endowment. £. s. d.	Amount of Subscriptions. £. s. d.	Salary of Teacher.	Dimensions of School-room in Feet.
Master,—*continued.*								
8	..	α	β	..	8 14 0	9 4 0	44 4 0	$13\frac{1}{2}\times20\frac{2}{3}$
3	..	β	β	..	35 0 0	..	..	..
..	..	β	γ	..	..	..	..	16×28
			Boys.					
1	..	β	γ	..	30 0 0	..	..	$14\frac{1}{2}\times18$
..	..	β	β	..	..	6 14 6	..	$12\frac{3}{4}\times13\frac{2}{3}$
6	..	α	β	..	18 0 0	..	..	..
..	..	γ	γ	..	21 17 0	..	..	24×12
6	..	α	β	..	..	9 0 0	14 0 0 and pence	16×20
..	..	β	γ	..	..	..	..	$19\frac{1}{2}\times13\frac{3}{4}$
..	..	β	γ	..	14 14 6	..	..	$16\frac{1}{6}\times18\frac{1}{4}$
2	1	α	β	..	16 4 0	..	34 0 0	$15\times31\frac{1}{4}$
1	..	β	β	..	15 15 0	..	..	$0\frac{2}{3}\times20$
4	..	α	β	..	23 8 0	..	..	..
6	..	α	β	..	..	36 10 0	4 6 0	..
6	..	α	β	..	..	..	..	$35\frac{1}{2}\times16$
..	..	..	..	..	..	..	..	..
19	..	β	β	..	..	203 8 0	..	20×44
3	..	α	β	..	..	17 0 0	..	$17\frac{1}{4}\times16\frac{1}{2}$
13	..	α	α	..	..	52 10 0	31 10 0 and pence	$31\frac{1}{2}\times19$
3	1	α	β	*	..	25 15 0	..	$26\times14\frac{1}{4}$
5	..	α	β	..	..	7 0 8	20 0 0	..
2	..	β	γ	..	7 10 0	..	..	$16\frac{1}{2}\times27$
8	..	α	α	..	88 0 0	..	..	..
..	..	γ	γ	..	3 0 0	10 0 0	38 0 0	16×23
..	..	β	γ	*	..	..	..	18×15
1	..	β	β	..	..	..	..	30×15
2	..	β	γ	..	..	..	..	21×30
7	1	β	α	..	50 0 0	..	75 0 0	21×66
..	..	β	γ	..	..	..	..	$15\frac{3}{4}\times27$
1	1	β	γ	..	..	..	..	..
..	..	α	α	..	17 14 0	14 10 0	36 0 0	$12\frac{1}{2}\times28\frac{1}{2}$
								$14\frac{1}{2}\times19\frac{1}{2}$
11	..	β	β	..	169 13 0	..	50 0 0 and fees.	46×18
A Mistress.								
..	..	α	β	*	..	..	..	$25\frac{1}{2}\times16$
..	..	α	β	*	..	..	..	$25\frac{1}{2}\times16$
..	..	α	α	*	..	..	..	$14\frac{1}{2}\times18\frac{1}{2}$
..	..	α	α	..	3 8 0	..	24 0 0	$9\times13\cdot5$
..	..	β	γ	..	80 0 0	..	..	$24\frac{1}{2}\times18$
..	..	β	β	..	..	..	..	$36\frac{3}{4}\times17\frac{3}{4}$
..	..	α	α	..	..	..	30 0 0 and pence	$18\times1\frac{1}{3}$
								$18\cdot4\frac{3}{4}$
..	..	α	α	..	Expense defrayed by the Vicar.			$14\frac{1}{2}\times25\frac{1}{2}$
..	..	α	β	..	..	40 0 0	12 0 0 and pence	46×20
..	..	β	γ	*	..	..	..	..

	Numbers present on the day of my visit.		Reading.				Writing.				Arithmetic.			
			Unable to read words of two Syllables.		Able to Read with ease.		On Slates only.		On Paper.		Learning first Four Rules		In Compound Rules.	
	B.	G.	B.	G.	B.	G.	B.	G.	B	G.	B.	G.	B.	G.
Schools under a														
Great Rowsley	11	18	Chil	dren				not	exa	mined.	..	..	..	..
Hartington	7	7	Chil	dren				not	exa	mined.	..	..	..	..
Hognaston	4	10	3	2	..	6	..	..	..	..	..	..	..	..
Holbrooke	15	19	7	4	5	13	11	17	4	2	2	3	2	..
Ingleby	6	4	C	hildr	en	not		exa	mine	d.	..	3	..	..
Kilburne	39	Chil	dren	16	no	t	fully	exa	mine	d.	15	..	..	..
Little Eaton	4	22	2	2	..	7	1	5	1	11	2	12	..	3
Mickleover	8	17	3	2	1	3	2	5	..	..	..	..	..	..
Mona	3	16	2	5	..	5	1	3	..	6	..	..	..	..
Mouley	27	20	12	5	..	2	21	10	6	10	..	..	..	..
Oakethorpe	20	22	12	8	4	3	4	11	6	3	6	11	2	..
Osmaston	2	31	1	10	..	10	..	..	..	..	..	12	..	..
Parwich (Al. Evans)	..	14	..	..	..	..	..	14	..	..	..	..	..	1
Parwich (My. Swindell)	10	27	..	..	..	..	7	21	..	..	..	..	..	..
Quorndon (Girls')	..	14	..	..	..	5	..	7	..	5	..	..	..	..
,, (Infants')	20	9	16	6	..	..	..	..	..	..	..	..	..	..
Shirley	2	22	..	4	..	5	..	..	..	5	..	5	..	..
Tissington	1	22	1	5	..	7	..	2	..	7	..	2	..	..
Twyford	8	13	4	1	..	5	..	..	2	4	4	7	..	..
Walton on Trent	12	10	5	6	..	..	..	..	..	..	..	..	..	..
Infant Schools under a Mistress,														
	Ab	out												
Dovebridge	30		..	..	..	..	..	..	..	..	..	..	..	..
Heage	19	33	15	15	2	9	3	7	..	8	..	..	..	..
Holbrooke	34		..	..	..	..	..	..	..	..	..	..	..	..
Spondon	42	39	..	..	..	..	..	..	..	..	..	..	..	..
Stapenhill	13	15	12	5	..	2	..	..	1	10	..	..	..	..

In addition to these, the teachers at Elvaston, Flagg, West Hulland, Markeaton, and Pinxton were visited during the absence of the children. The inspection at Glossop was prevented by the death, and at Ripley by the illness, of the schoolmaster. At Hayfield the school has been closed temporarily from the difficulty of finding a proper teacher with the means at the disposal of the school managers.

The particulars of the more important schools will be found enumerated in detail in the special reports annexed.

Not only do the circumstances under which schools are inspected vary, but also it is difficult to recollect and compare with accuracy the impressions made during a series of visits extending over a lengthened period. In the following attempts at classification (in those instances where the names are not placed alpha-

In Proportion and Higher Rules. B.	In Proportion and Higher Rules. G.	Cleanliness of Children.	Intelligence of Children.	Training of Teacher.	Amount of Endowment.	Amount of Subscriptions.	Salary of Teacher.	Dimensions of School room in Feet.
Mistress,—*continued.*								
..	..	α	..	*	..	..	..	$18\frac{1}{2}\times43$
..	..	β	..	..	..	..	..	$13\frac{1}{2}\times20\frac{2}{3}$
..	..	α	β	..	..	..	..	..
..	..	α	α	..	..	..	..	40×14
..	..	β	γ	..	..	..	..	..
..	..	α	α	..	..	..	..	..
..	..	α	β	..	..	30 0 0	8 0 0 and pence	24×17½ each.
..	..	β	β	..	..	..	..	14×11
..	..	α	β	*	..	..	..	..
..	..	β	β	..	..	..	..	..
..	..	β	β	..	..	..	..	20×40
..	..	α	α	..	..	..	..	$16\frac{2}{3}\times15\frac{2}{3}$
								$11\times15\frac{1}{2}$
..	..	..	..	..	..	..	..	..
..	..	.	..	..	..	..	..	..
..	..	β	γ	..	..	..	..	$19\frac{3}{4}\times8\frac{1}{2}$
..	..	β	β	..	..	..	..	$11\frac{1}{2}\times11\frac{1}{2}$
..	..	α	β	..	..	..	..	..
..	..	α	β	..	..	..	..	$23\frac{1}{2}\times16$
..	..	α	β	..	..	..	..	..
..	..	α	β	..	..	..	..	..
FITTED WITH A GALLERY.								
..	..	α	β	*	..	..	9 0 0 and pence	21×18
..	..	β	α	*	..	13.10 0	20 0 0	21×39
..	..	α	β	*	..	..	33 0 0	$28\frac{1}{2}\times16$
..	..	..	..	*	..	..	25 0 0	30×20
..	..	α	α	..	..	..	..	..

betically), I must be regarded in many instances as offering only an approximation to the judgment that would be formed by a visitor who took the cases that seem most nearly parallel in succession.

Schools under Masters.

Of the schools under masters I was most gratified with those at Sudbury, Tickenhall, Chaddesden, Doveridge, Great Longstone, and Smalley. The masters at Shardlow and Spondon have considerable ability, and their schools are well disciplined, and in many respects highly satisfactory. There is much to give pleasure in the Stapenhill, Brimington, Walton on Trent, Kirk Langley, Mackworth, Shirley, and Ockbrook schools, and in almost all that I have mentioned the influence of the clergy and their families is strongly felt, especially in the more important

subjects of instruction. Of the masters who are left to follow out in a great measure their own plans of instruction, I was most interested in those at Findern, Hault-Hucknall, Heage, and Eckington. The master of the British school at Derby is a very active, methodical, and capable person, but he is sadly overtasked. The masters at Bolsover, Brampton (not the endowed school), Deerleap, Hartington, Holmesfield, and Risley, appeared to me hard-working and respectable men, but I could have wished that they bestowed more pains on the moral and intellectual culture of their pupils. Of the rest, the qualifications of the Newbold, North Wingfield, Scropton, and West Hallam teachers scarcely reached mediocrity, while those at Ashover, Aston, Bradborne, Duffield, Eyam, Heath, Hognaston, Horseley, Killamarsh, Kirk Ireton, Mickleover, Shottle, South Normanton, South Wingfield, Stony Middleton, Tibshelf, and Unstone seemed to me of a still inferior kind. The teachers of the endowed schools at Brampton (endowment 10*l.* 18*s.*), Church Broughton (endowment 30*l.*), Clown (endowment 17*l.*), Dronfield (endowment 208*l.*), Hilton (endowment 20*l.* 10*s.*), and Monyash (endowment 14*l.*), are, in my judgment, wholly unfitted for their office.

Schools under Mistresses.

Of the schools superintended by females, I was best pleased with those at Sudbury, Doveridge, Brailsford, Holbrooke, and Dronfield. The girls at the Derby British School were clean, orderly, and intelligent; their knowledge of Scripture was very gratifying. The schools at Great Rowsley, Darley Dale, Osmaston, Horsley, and Duffield, are pleasingly and efficiently superintended, and seemed to me to be working well; and of dame-schools I was much gratified with those at Allestree, Barrow, Little Eaton, Parwich, Shirley, Twyford, and Walton on Trent. The condition of the endowed school at Carsington is not satisfactory, but it has been submitted to the consideration of the trustees, and there is hope of its being shortly placed on a better footing. Of the infant-schools, the teachers at Heage and Stapenhill seemed to me to have most zeal, cheerfulness, and capacity for their work; those, however, at Doveridge and Spondon cannot be visited without much pleasure.

Sunday Schools not noticed.

In these observations I have taken no notice of the Sunday-schools visited, with all of which I was greatly pleased; but as these cannot be efficiently inspected, except at their proper seasons of meeting, I have regarded them as beyond the compass of my official engagements. No one, however, who is desirous of forming a right estimate of the social prospects of this country can overlook these, either in our agricultural or our manufacturing districts, without neglecting one of the most important and fruitful elements of their culture and improvement.

General Observations—Advantage derived from the habitual visits of the Clergyman and of the upper classes.

I have but little to add in the way of general observations of the schools inspected to those remarks that have been already submitted to your Lordships. The more my experience is enlarged, the more earnestly desirous do I feel that the clergy should take a living, constant, and effective interest in the teaching given in our schools. Where this is the case how much may be effected with the very humblest means almost exceeds belief. In our rural districts in those schools under masters where the clergyman does not exercise his legitimate influence, it is an observation which I can scarcely qualify by a single exception, that attention is bestowed upon subjects in the inverse proportion of their real importance. Greatest pains are taken with the writing, next with the arithmetic: the accuracy and intelligence with which the reading lesson is got through are but little thought of, and not unfrequently the moral and religious training of the children are avowedly neglected as beside the province of the teacher. This is a sad, but by no means a hopeless state of things. Instances where the pastor of the parish does not practically feel that the children in the school are the lambs of his flock, needing, and to be benefited by his actual teaching there, and constant superintendence, are daily becoming more rare. Much also might be done if those of the upper classes (who living in the district are bound to take an interest in the welfare of those below them), would not only take occasion as opportunities arise to suggest to our teachers how great is their responsibility, and how much (humanly speaking) is in their hands; but would also show by their conduct that they felt the debt which society owes to the laborious and self-denying cultivator of a soil, which, according to the tillage that it receives, proves fruitful in life or death to the highest interests of man. A great deal doubtless is unconsciously effected by teachers of integrity, through the silent influence of their example; but as many of these (passing their lives in a laborious calling, their mental as well as their bodily vision enclosed by the walls of their schoolroom) seem never to have reflected on what it was that made their office truly honourable, it is important that those about them who are capable of affording assistance should help them to keep the right end in view, as well as point out the means by which subordinate matters may be accomplished.

Necessity for leading Children to understand the Reading Lesson.

Next after the pains that are bestowed on the religious and moral training of children, the teaching them the chief matters of faith and duty, the impressing them with an abiding sense of their Maker's presence, and their own accountableness to him, the cultivation of habits of obedience, diligence, cleanliness, and order, no

instruction seems to be more important than that which is occupied in leading children not only to understand, but also to consider and profit by what they read: we cannot expect them to be interested in that of which they do not in some measure apprehend every part. If we ourselves are reading a strange language, and are not acquainted with the meaning of but a single word, what dimness and perplexity is thrown over the whole! Every fresh term rightly conceived by the mind becomes the centre of a new cluster of ideas, adding substance and compactness to what has previously come under observation, and making the acquisition of new treasures more easy. What I suggest will not be accomplished by reading to the children, on the occurrence of a new word, the first synonyme that may be found for it in our English dictionaries, (and much more objectionable is the practice prevalent in some schools, of making the committal to memory of the spelling and meaning of a dozen words as set down in Entick, a portion of the daily lessons,) but I am anxious that the master should lead his pupils (chiefly by questioning) to associate new words with ideas previously acquired, and take pains, if possible, to distinguish their usage from that of their supposed synonymes, by suggesting sentences where the one cannot be displaced by the other, without marring the sense. For example, "strictly" is in Johnson and Bailey, interpreted by "exactly," but instances will readily occur to an intelligent teacher, where one word is fitting, and the other plainly improper.

So far, however, are our ordinary teachers from taking pains in this respect, that it is no uncommon thing, even in schools where the master is diligent, but where there is a want of method and arrangement, for the reading-lesson to be slurred over, without care being used that the mechanical parts of the exercise (such as the right pronunciation of the words, and attention to stops) shall not be neglected; the master being, meanwhile, really occupied in mending pens or copying out returns for the overseers of the poor.

Many plans have been suggested for leading children to take an interest in what they read. Those who are too young to write may be required to express in their own words, when the lesson is over, the substance of what has been communicated. For example, children of five years of age, if they have received early training, will give a satisfactory account of such a history as that of Jonah, the prophet, upon its being once told to them. Those who are able to write should be encouraged, twice in the week at least, to set down on paper, or on their slates, all that they can recollect from memory of the most interesting lesson of the day. In such an exercise, many faculties of the mind would be called into healthful activity.

Mr. Emerson Davis, of the Massachusetts' Board of Education, in his "Teacher Taught" (pp. 77 and 78), gives the following examples of modes in which the Bible has been used in schools:—

The teacher, two or three times in the week, told his pupils to study hard thirty minutes, and then they might lay down their books, and he would tell them a story. He always selected a story from the Bible, and related it in a familiar but serious and dignified style. When he had finished, he would ask the scholars if any of them recollected to have ever heard or read the story. Sometimes a scholar would recognise it, and sometimes not. They were then told to turn to a certain chapter and verse, and read the story for themselves. By this means a very great desire was awakened among the children to read the Bible through. At the close of his school one winter, he found that several children had begun to read the Bible in course; some had gone almost half way through it.

Similar to this was the method adopted by another teacher, contemporary with the former. On Saturday, he would tell the children some singular fact, and request them to find the story, and read the chapter containing it on Monday, instead of the usual lesson. One object was to induce the children to spend their Sabbaths in searching the Scriptures.

It had the desired effect—his lessons were given out in this manner, "You may find the chapter that tells about the king whose eyes were put out," or "the chapter that tells about the prince's son who was lamed by the carelessness of his nurse," or "you may read about the captain who was cured in consequence of what a little captive girl told him of the ability of a prophet to heal him."

There is another method that has been adopted with very beneficial results. If a child is angry, or if any scholar exhibits a contentious spirit, let a class read on the occasion selections of Scripture touching that subject; or, if any scholar tells lies, is disobedient to parents, or is indolent, or profane, or conducts himself in any way improperly, appeal to the law and testimony of God on the subject, and require the offender, or the class to which he belongs, toread an appropriate selection from the Bible. Selections should be made by the teacher at his leisure.

The last cited paragraph well deserves attention, but care must be taken that the suggestions which it contains be carried out in a spirit of reverence and love. My experience, however, fully accords with that of the writer, as to the desirableness of invariably using and acknowledging the Bible as the standard of morality in our schools. The inquiry, "What does the Word of God say upon this matter?" being habitually and reverently put, if rightly answered, cannot fail to produce order and quietness, and to facilitate the good governance of the children, while it will associate a sense of God's presence with just conceptions of the extent of his laws as they find these crossing them at every step wherever they go wrong. Further, it is scarcely possible to overrate the intellectual benefit which is derived from that proper balance which is given to the mind, and the light which is thrown upon the conscience, from a constant regard to the revealed will of God.

Organization.

I have on previous occasions adverted to the advantages of a proper organization in our schools, so that the children should be

divided into as few classes as possible, and that there should be a methodical arrangement of the daily lessons. The children need cultivation in this respect, the formation of habits of order being an essential part of right education. Regularity contributes to quietness and good temper. Where much is to be done, much will be neglected, if there be no system of operation. In charitable institutions, the first duty is to have regard to those for whose benefit the funds of the charity were originally set apart. But in a very large number of our endowed schools attended by the children of the poor, the labourer's child is not placed on the same footing with that of the farmer, and the tradesman; and many masters who do not seem conscious that they are neglecting their duty, devote a large portion of their time to the instruction of the pay-scholars in grammar, and the higher parts of arithmetic, while the free children are only set to read during a few odd fragments of time that can be spared from the teaching of the rest. It is no wonder that the poor feel the injustice of this, and withdraw their children from such schools. I should be inclined to allow in our free schools no children to attend without the payment of a small sum (such as a penny weekly). This payment might go towards the supplying of books, writing materials, &c., which should be furnished to all alike. The sale of these should not be left in the master's hands; but, whatever might be thought of such an arrangement, unquestionably the amount and quality of the instruction in schools aided by the State, or supported by endowments, should in no respect be limited by the pecuniary resources of the children. If those who can afford to decline the benefit of being placed on the cottager's list, expect to be excused from compliance with the rules of the school, or think it a hardship to stand in the same class with the children of the poor, they ought not to be admitted at all; no school can be efficient where the teacher has not fixed on a plan of lessons which he carries out with firmness and intelligence. Moreover, the distance in this country between opulence and penury is already too wide, and no matters are of small importance which tend to make it more palpable and distinct.

Results from Inspection.

In my previous Report I felt called upon to particularize, by name, several schools that seemed to me lamentably deficient in the most important respects. In some of these I have reason to believe that a great and salutary change has since taken place. At Heage and Smalley, where the managers of the endowed schools were at first indisposed to receive my visits on account of the unfitness of the teachers, new masters have been appointed, whom I found during the present spring actively and efficiently at work in flourishing schools; and among the places of which I have received particular information as to the improvements that

have been effected, Ashbourne, Derby, Mugginton, and Wirksworth, should especially be noticed. In the latter town, where, at the time of my visit, I found only 11 children assembled in rooms calculated for 200, great and most praiseworthy exertions, at a personal sacrifice of 100*l.* per annum, have been made by the master. There is now an average attendance of 130 children, under two most hard-working and efficient assistants appointed during the last year, one at a salary of 100*l.*, the other at 80*l.* per annum; the school-room having been also refitted and furnished on the most approved principles. Of Mugginton it should have been noticed in the last Report that a substantial school building had recently been erected by the trustees.

The information in the Appendix, furnished to me by the clergy relative to those parishes that were left unvisited, will afford many lamentable instances of the disproportion of the population to the means provided for their instruction. Under the head of each ecclesiastical district will be found the substance of the facts communicated to me in answer to the inquiry as to what schools for the poor were at present open in those districts connected with the church.

Whittington.

At Whittington, where there is an endowment of near 80*l.*, the right of trustee being disputed by several of the leading gentry, the school funds have been involved in a Chancery suit, and are at present in no way available for the benefit of a population of 751.

Staveley.

In the parish of Staveley there have been no scholars for several years at the Netherthorpe free school. The master is the same person who held office at the period of the inquiry into the school funds by the Charity Commissioners, an account of which was printed in 1828. The income then enjoyed by the master was 29*l.* per annum, with the residence. At present some payments charged on the property of E. S. Pole, Esq., of Radborne, are withheld by him until the school shall be placed on a better footing. Mr. Pole acts upon the opinion of legal advisers, and is anxious that the circumstances of the school should be investigated; but is unwilling to sanction the abuse of the charity funds by contributing them to the maintenance of a nominal master.

Chesterfield.

At Chesterfield the petty school under a mistress, endowed with 79*l.* per annum, of which the mistress receives 30*l.*, is attended by between 70 and 80 children, and the teachers are represented as persons of most respectable character. But there is also a grammar school, in which 110*l.* per annum is appropriated to the maintenance of a teacher, and to which no appointment has been

made since the death of the late schoolmaster in 1832. He had held the post for 38 years. It appears from the Reports of the Charity Commissioners, that during some part of that time there was not a single scholar; that during the whole of it the number scarce ever exceeded seven, of whom only four or five at any one period were free. It appears also that the master, being curate at two neighbouring villages, never attended at the school for more than an hour and a half, or, at most, two hours, during the day; that on two days in the week his attendance did not exceed one hour, and that even this small pittance of time was liable to constant interruptions, there being many days when the master was entirely absent.

Need for a change in the Law relative to Endowed Schools.

There being with many a disinclination to appeal to the law, as it at present stands, from a fear of the slowness and uncertainty of a Chancery suit, the expenses of which would frequently swallow up the entire proceeds of the charity, the circumstances of several endowed schools are such as practically the trustees (however desirous) have no means of remedying. I have previously given more examples than one of flagrant acts of turpitude being committed by masters, whom still it was found difficult to dislodge from their posts; but these cases are not all for which an inexpensive remedy (as summary as may be consistent with right) is greatly needed.

There are numberless instances in which the removal of the master seems imperatively called for on grounds of compassion towards the children and justice towards the original founder, where no charge of moral delinquency (such as the law takes cognizance of) can be judicially established. I will give, in conclusion, two or three extracts from letters addressed to me out of Derbyshire, which, as specimens, will exemplify from present difficulties the general condition of a large number of cases:—

1. The first is from the communications of the clergyman of the parish, who, although deeply anxious, has no means for checking the evil, the income which he receives for his ministrations not exceeding 50*l.* per annum.

I am sorry that I cannot ask you to inspect the school, for there is scarcely any, if any, to inspect. The present master has the school-house in his possession, and draws his salary; but he does just as he likes. The master was appointed in 1814. After he had held his position about eleven years, attempts were made by the then trustees to expel him on the ground of gross neglect of the school. It was alleged that he had made a practice of hiring himself as a day-labourer during harvest time, and had at other seasons of the year been in the habit of sending the children, *during school hours*, to gather sticks for him, or to collect manure from the public roads. A second attempt was made by different trustees about seven years after. Repeated complaints were made that the school was grievously and shamefully neglected.

Hitherto, however, the efforts made have been unavailing, and the master, although at times publicly seen in a state of drunkenness, still retains his post.

2. In the second instance I will extract portions of the letters of two of the trustees, the first being the clergyman of the parish, to whom I wrote immediately on visiting the school, and who referred me to the second (one of the farmers of the village). My letters to each expressed briefly my opinion of the schoolmaster, whose children were in sad disorder, and who appeared to me self-conceited, ignorant, and barbarous in his manners, to an extent that I have rarely witnessed.

As regards my opinion of the master, I am sorry to say that it entirely coincides with that which you have been led to form of him. A more improper person, I conceive, could not have been selected to fill the office of village schoolmaster.—(*Extract from the letter of the clergyman.*)

With regard to the same master, the other trustee, (who has the chief superintendence of the affairs of the school,) a respectable farmer in the village, writes :—

I sincerely wish it were in my power to point out a remedy for the state of things in our free school. I am sure I fully accord with yourself and our clergyman in the opinion you have formed respecting the master who is both rude and uncouth. Some time ago he betrayed great ignorance, as also ill manners. I do on many accounts consider him unfit for his office. As there are nine trustees, it is difficult to be unanimous ; but I am very sure there is a great necessity for a good change to be effected. I should be sorry to have the old man thrown out of employment ; but I do not think he would listen to any rules for a material change in his conduct or manner of teaching.

3. In the last case I must premise that on the day of my visit, out of a population of 677, about a dozen children, dirty and disordered to the last degree, were assembled under the tuition of a poor lame creature, apparently disabled by paralysis. Of these three could read a verse in St. John's gospel without blundering ; of the rest the master struck some five or six others, as they clustered round him, on their heads with the book which he held in his hand (the New Testament), at each mistake. On writing to the clergyman to inquire if anything can be done, he replies :—

I equally lament, with yourself, the state of the ———— endowed school, and so does my friend Mr. ——— (another of the trustees) ; but we are at a loss to know what steps to take to make it more efficient. The master was elected before I came to reside, and indeed before I had any concern with the village. His character as a moral man is irreproachable ; but I must agree with you that he is not fitted for such a situation.

If a state of things such as these which have thus briefly been brought under your Lordships' notice be not susceptible of an inexpensive and comparatively sure remedy, it is not easy to appreciate the extent of the mischief of which they prove fruitful

sources, both in the immediate localities where they occur, and to the community at large; not only are the inhabitants of particular neighbourhoods deprived of all the benefit that might result from the right employment of such funds, but as the injustice is a crying one, its existence adds force to the complaints of demagogues and the seditious writings of the disaffected. I have myself had complaints made to me by the poor, which showed their strong sense of the wrong done by abuses such as I have been describing.

My Lords, I am, with much respect,
Your Lordships' obedient humble servant,
(Signed) JOHN ALLEN.

APPENDIX.

Information relative to certain Parishes in Derbyshire, furnished by the Clergy in answer to my Inquiries.

ALFRETON.—No daily school for the poor in this town. A school under a master about one mile out of the town, endowed with 50*l.* per annum, attended by 60 children. Population of the town 1,774.

ALSOP LE DALE.—Only four houses in the parish. No school. Population 67.

ALVESTON.—A daily school, attended by about 25 children (endowment 10*l.*). The master a Methodist. A Sunday-school, connected with the Church, attended by about 30 boys and 50 girls. Population 493.

BARLBOROUGH.—School for girls, with a few little boys, under the rector's management; number in attendance 35. School for boys, where the Church Catechism is taught; number in attendance 42. Population 804.

BARLOW IN STAVELEY.—A daily school under a master (endowment 3*l.*); attended by about 50 scholars, who with the exception of six pay for their instruction. A Sunday-school, supported by voluntary subscriptions, containing above 70 children, both under the superintendence of the clergyman, and represented to be in a good state.

BARTON BLOUNT.—No poor children in the parish. Population 68.

BOULTON.—No school connected with the Church. Only a dame-school in the parish. Population 171.

BENTLEY.—A week-day school, taught by a labourer, attended by less than 20 scholars; the older children attend the Ilam school, distant two miles and a half.

BOYLSTONE.—One school, established by the rector's daughter about six months since, where 35 poor children are instructed gratuitously in a cottage. No funds for building a school-room, which is greatly needed. Population 343.

BRADLEY.—Two dame-schools, one under the clergyman, attended by about 17, the other a private school, attended by seven or eight. Population 271.

BRASSINGTON.—An endowed day-school, attended by 79 children, under a master. Population 776.

BRETBY.—A week-day school for boys and girls, attended by about 60 children. Population 298.

CALKE.—Only a dame-school for reading, sewing, or knitting; average attendance from 16 to 23; the older children go to Tickenhall. Population 55.

CHARLESWORTH IN GLOSSOP.—By some anomaly the Dissenters are in possession of this district, church fees, and parsonage. There is a good school-room built by subscription, used only as a Sunday-school. Population 1,732.

CHELLASTON.—No daily school connected with the Church; two private schools for very little children the only day-schools; both taught by members of the Church. A Church Sunday-school, the average attendance of children about 50. Population 461.

CHURCH GRESLEY.—One school, connected with the Church, where the boys and girls receive instruction in different rooms. Numbers in attendance (24th February, 1843), 69 boys and 81 girls, with an addition of eight children on the Sunday. Population 993.

CLIFTON IN ASHBOURNE.—No school. Some of the children go to Ashbourne. Population 839.

CRICH.—Only a Sunday-school, attended by about 60 children. A daily school in contemplation. Population 3,698.

DALBURY.—A school in contemplation. Population 221.

DARWENT.—A day-school under a master, endowed with 6*l.* 16*s.* per annum, attended by 34 children. A small dame-school, attended by six children, the only other school in the chapelry. Population 164.

DETHICK IN ASHOVER.—A school not connected with the Church, attended by from 112 to 120 children. About 50 attend on the Sunday, and are taught the Church Catechism. Population 879.

EARL STERNDALE IN HARTINGTON.—A daily and Sunday-school. Number of children in attendance at the former 20, at the latter 28. Population 362.

EATON (LONG).—School for boys and girls, under a master and mistress.

EDLASTON.—A week-day school, under a mistress, attended by about 12 or 15 children; and a Sunday-school of 27 children. Population 214.

EGGINTON.—A Sunday-school connected with the Church, supported by subscription, at which about 50 children attend. There is also a week-day school in which the parents pay for the instruction of their children. Population 374.

ELMTON.—A week-day school under the parish clerk, at which the parents of the children pay for their instruction; number in attendance from 15 to 20. A Sunday-school under the same master, supported by the patron of the living. Population 433.

ELVASTON.—A dame-school attended by 20 children. Two night-

schools attended by 26 children in all. A Sunday-school attended by 60 children. All gratuitous except 12 of the attendants at the dame-school. Population 518.

ETWALL.—Daily-school, attended by 30 children. The Sunday-school, attended by 36 children. Population 689.

FERNILEE IN HOPE.—An endowed school under a master in a small ill-ventilated room, attended by upwards of 70 children. Endowment 18*l.* per annum.

FOREMARK AND INGLEBY.—A dame-school attended by 12 children. Population 212.

GLOSSOP.—School closed on account of the late schoolmaster's decease at the time of my inquiry. A new master to be appointed without-delay. Population 3,548.

HAYFIELD —A day-school endowed with 14*l.* per annum, at present closed, the last teacher having left on account of the smallness of the salary. A large Sunday-school. Population 1,499.

KEDLESTONE.—During the week the children may attend the Quarndon free-school. A Sunday-school attended by all the poor children, about 14 in number. Population 102.

KIRK HALLAM.—A Sunday-school of 12 children.

LANGWITH.—A daily and Sunday-school, the former supported by the Duke of Devonshire, the latter supported by the rector; about 30 children in attendance. Population 194.

LULLINGTON.—The building of a new school-room, under a minister, contemplated this spring; at present about 30 daily scholars in attendance. Population 650.

MAPLETON.—A Sunday-school only. Population 204.

MELBOURNE —The endowment 19*l.* 10*s.* Two large school-rooms, but the school has latterly fallen off both in numbers and usefulness; the master being a man of violent temper; at present the average number of children about 60. Population 2,583.

MELLOR.—No daily school connected with the Church; an endowed school in the church-yard, over which the minister has no control, attended by 16 boys and 14 girls; endowment 30*l.* A Church Sunday-school, comprising 85 boys, 92 girls. Population 2,015.

MORTON.—No daily school of any description whatever in the whole parish, comprising also the township of Brackenfield. A Sunday-school commenced by the clergymen about a year and a half since, attended by about 20 children; a school-room in contemplation. Population 646.

OSMASTON NEAR DERBY.—Only a dame-school for reading, sewing, or knitting, the older children go to Derby; average attendance 11. Population 271.

PEAK FOREST.—A school under a master who has held his post 44 years, attended by about 22 children; the present condition not satisfactory; an improvement contemplated. Population 575.

PINXTON.—No school connected with the Church. A school under a master maintained by the Squire.

PLEASLEY.—Week-day and Sunday-school, attended by about 40 children under a mistress.

REPTON.—A week-day girls' school; average attendance 70. A boys' school in contemplation. Population 1,943.

SAWLEY.—Boys' and girls' school under a master and mistress. Population 1,933.

SCARCLIFF.—Daily school attended by 35 children under a master; endowment 12*l.* 4*s.* 6*d.* per annum. Sunday-school attended by 34 boys and 39 girls.

SHIREBROOK IN PLEASLEY.—Week-day and Sunday-school attended by about 40 children, under a mistress during the week, a master on Sunday. Population 329.

SOMERSHALL HERBERT.—Week-day and Sunday school, chiefly maintained by the rector; attendance from 20 to 25. Population 120.

STANLEY.—One dame-school, in which from 10 to 20 children are taught reading and knitting in a cottage. Population 368.

STANTON BY DALE.—No weekly school connected with the Church; a dame-school for little children; some of the older children attend the Risley free-school. Population 480.

STAVELEY.—Three dame-schools, in each of which 12 poor children are taught gratuitously. A school at Handley, where 24 children are taught gratuitously; two new school-rooms with a house now building; about 300 children in attendance at the Sunday-school. Population 2,688.

TEMPLE NORMANTON.—A school endowed with house and 4*l.* per annum. Average attendance, week-days and Sundays, about 28.

THORPE.—A dame school attended by 22 children; the boys from the age of 6 and upwards are permitted to attend Mr. Watts Russell's school at Ilam gratuitously. The Sunday-school comprises 34 children. Population 196.

WESTON ON TRENT.—Two Sunday-schools connected with the Church, the number attending the two being about 50. No daily school, except a very small dame-school. Population 396.

WHITTINGTON.—The right of acting as trustee being disputed, the school is closed, the funds are assigned to the payment of the costs of a chancery suit now pending. Population 751.

WILLESLEY.—The parish consists only of ten houses; the few children go to a neighbouring parish. Population 53.

WILNE.—Day-school supported by the owners of the cotton-mills, and a Sunday-school connected with the Church; also a school under a mistress at Draycott. Population 2,057.

REPORT ON THE BATTERSEA TRAINING SCHOOL AND THE BATTERSEA VILLAGE SCHOOL FOR BOYS,

By the Rev. JOHN ALLEN, M.A., Her Majesty's Inspector of Schools.

MY LORDS, King's College, London, August 18, 1843.

IN obedience to your Lordships' instructions, received on the 16th November, 1842, I have the honour to present my Report on the Battersea training school, and the Battersea village school for boys, at which the pupils of the Normal Institution are instructed, and exercised in the art of teaching.

The history, objects, and plan of the training school have been so exactly and fully set forth in the report of Mr. Kay Shuttleworth, and Mr. Tufnell, (printed by the Poor Law Commissioners in 1841,) that I shall feel it necessary to do little more than state, as distinctly as I am able, those facts connected with the actual state of the institution which have been ascertained during the progress of my inquiry.

Course of Instruction.

The course of instruction as at present followed, does not extend beyond that marked out in the printed report for the attainment of the pupils in training during the first year of their residence. It seems probable that from the continual influx of those anxious to avail themselves of the benefits of the institution, in conjunction with the pressing demand for capable schoolmasters, the studies of the training pupils will for the future be confined nearly within the limits of a year.

The tendency thus to limit the course of training has been brought about rather in spite of the views and wishes of the directors than with their concurrence.

Cost.

The average cost of the maintenance, lodging, and education of each pupil, amounts to 50*l.* per annum, including the rent, salaries, and all incidental expenses. Many pupils have been admitted without charge, and some at low rates of payment, but the highest remuneration has been 30*l.* per annum, together with a weekly sum of 1*s.* The directors have recently admitted adult pupils only, at a charge of 30*l.* per annum. They have therefore estimated the amount of outlay, which falls upon themselves, for 50 pupils, at 1,000*l.* per annum; but the engagement of any new masters would increase this expenditure by the whole salary and emoluments of such additions to their present staff. The patrons and friends of pupils are seldom disposed to expend more than 30*l.* upon the training of a master, and according to the above scheme one year's maintenance and training can be procured for such a sum; the arrangements of the establishment allowing that

50 schoolmasters may annually receive certificates of one year's training, by an outlay of 1,000*l.* per annum, in addition to the payments of the pupils.

The directors have reluctantly thus yielded to the force of circumstances, and the inadequacy of their private resources alone has compelled them to abandon for the present their earnest desire to prolong the period of training to two or three years. Their impression is that the results of one year's training must necessarily be unsatisfactory in many respects, particularly in that familiarity with the details of school discipline and management, which can only be acquired by a prolonged attendance on the practical exercises in the village school, and on the critical lessons founded thereon, in which the maxims of the teacher's art are imparted. Six months at least ought, in the opinion of the directors, to be devoted to daily attendance during three hours in the village school, when the student would be superintended in the management of his class by an experienced master, and gradually led to adopt the best methods of discipline and instruction. One year's instruction in the training school is the shortest period of preparation for these practical lessons in the village school. A year and a half, therefore, they conceive to be the minimum period which ought to be devoted to the instruction and training of a schoolmaster of the average attainments of such candidates as present themselves for admission.

Although, in submission to a necessity which they cannot control, the directors have, as it has been thus stated, consented to receive and train pupils for one year only, this arrangement has been found peculiarly inconvenient with regard to those junior pupils who had entered the establishment for longer periods. It has been endeavoured to reconcile their remaining in the establishment with the contraction of the course of instruction, by employing these younger pupils to a great extent in the village school, and the skill which they have acquired as teachers at an early age is attributable to the extent to which they have been so employed.

Several of the junior pupils have been sent forth, either as assistants of schools or in sole charge of rural schools, aided by a matron; and soon after the ensuing Christmas, the training school will contain no pupils under 18 years of age, and they will chiefly enter for one year only.

The directors, however, wish it to be understood that, as far as their funds will permit them, they are desirous of making arrangements to facilitate the instruction of a pupil beyond this course of a year. If they find the patrons and friends of pupils disposed to permit their remaining for a year and a half, or even for a longer period, an advanced class will be formed for the instruction of such; but in that case the appointment of an additional assistant would be indispensable for enabling the present masters to take charge of those additional classes.

Circumstances of the Inspection.

When I visited the institution in November last, for the purposes of inspection, unavoidable circumstances had concurred to disturb the usual course of instruction and training:—among these were the recent illness of Mr. Tate, and the more alarming indisposition of an exemplary master (Mr. Horne), from whose labours the training school has (as I am assured) reaped the most signal benefits, and who was compelled to exchange his duties for an appointment under the Government in a warmer climate. Mr. Horne's sudden removal had occasioned a void in the establishment not easily filled up. After inquiry and deliberation, during which the vacant office had been entrusted, provisionally, to a gentleman then about to take charge of a model and training school in one of the colonies, the duties were confided, with the entire satisfaction of the directors, to the Reverend John Hunter, the present chaplain and master. I approached the examination of the school on my first visit under circumstances therefore unfavourable to the exhibition of the entire results of the instruction and training; and although the inspection was at that season invited by the directors, and welcomed by the masters; it was yet felt by them, and by myself, that a second examination of the pupils in training would enable me more effectually to test the efficiency of the institution.

Your Lordships' consent having been obtained, my examination was repeated after an interval of four months, namely, at the close of March in the present year.

In grammar, and in some departments of the religious instruction, the examination at my first visit was conducted orally, but in all other respects it was through the medium of written questions; these were drawn up by myself, after having received information from the tutors, as to the subjects to which attention had been specially directed during the previous quarter,* as well as with regard to the mode, extent and general direction of their ordinary teaching. The answers to these questions were written at a sitting by the pupils in my presence without recourse to books, tables, or other adventitious help.

As an additional means for enabling me to set such questions as would in some measure fairly embrace the chief topics of instruction communicated to the pupils, I attended the lectures of the several tutors; and by this means, I had also an opportunity of noticing how admirably well these gentlemen did their work. In my judgment their modes of teaching were characterized by remarkable accuracy, clearness, and spirit.

Means and Plan of Instruction.

Of the unceasing attention and zeal for the best interests of the institution, manifested by the vicar of the parish, the Hon. and

* For example, I was told by Mr. Hunter, that particular attention had recently been given to the gospel according to St. Matthew.

Rev. Robert Eden, it hardly becomes me to speak. From the first establishment of the training school he has devoted, week by week, a large portion of his valuable time to its superintendence and instruction. Every Monday a lecture is given by him to the pupils on Scripture and on the doctrines of the church, by which means he secures that kind of instruction which he wishes to be imparted by the pupils in training to the boys in the village school. The directors have also been anxious to avail themselves of his judgment as to the character and qualifications of the pupils of the training school previously to their admission.

The pupils are under the regular instruction of five teachers, Mr. Hunter, Mr. Tate, Mr. Macleod, Mr. Hughes, and Mr. May, their several spheres of labour being apportioned as follows:—

To the Rev. John Hunter (a clergyman of the Scottish Episcopal Church) is confided the religious teaching and the general superintendence of the entire establishment. As chaplain he conducts the morning and evening daily devotions, at both of which services a portion of Holy Scripture is read, and the Family Prayers compiled by the Bishop of London are used, followed by the Lord's Prayer and the concluding verse of the Second Epistle to the Corinthians.

After the Evening Prayers the chaplain receives and reads the reports of the several superintendents, concerning the conduct of the pupils in the classes and during the household and garden work. The registers of attendance on the classes are presented, and any want of punctuality is noticed.

This period is appropriated to such admonitions as the chaplain may think it desirable to utter. The minds of the pupils are prepared by the previous religious exercise to review the occurrences of the day, and the chaplain endeavours to lead them to apply to their duties the principles of which Holy Scripture is the source. These services are conducted with simplicity and solemnity, and the chaplain's suggestions and admonitions are made in a gentle tone in harmony with the previous service.

The conduct of any individual pupil is not the subject of public comment until the chaplain has endeavoured, by private interviews, to produce the desired effect on his mind.

In the religious instruction, the first object proposed is to make the pupils well acquainted with Holy Scripture, and next to explain to them the Liturgy and formularies of the church by the aid of the Bible, showing their accordance therewith. Mr. Hunter's character will be a sufficient guarantee to all that have the happiness of knowing him that his teaching in this respect will not want that warmth and life which is essential to its efficacy; and while it is his endeavour to set forth scriptural truth, he feels it to be his wisdom to endeavour also to set forth that truth in those proportions and with that distinctness with which it is to be found in Scripture. What is there most energetically and con-

tinuously dwelt upon, that he feels it necessary to make the main subject of his teaching. He is desirous, also, that while his pupils have a clear apprehension of the great doctrines of the creeds and of the principles of the Reformation as exhibited by our church, they should hold these in a tolerant spirit, as witnesses rather for the truth than against the opinions of those around them.

Hitherto all the pupils have regularly attended Divine worship at the parish church on the Sunday, although some few of them had not been accustomed to do so before their admission. If the case should arise of one who earnestly requested to attend statedly the public worship of a body of Christians not in communion with the Church of England, permission would not be withheld. It would, however, be represented to him, that unless he could conscientiously conform to the practice of the students in this respect he had better not join the institution, and that the harmony of the household could not be preserved if a spirit of controversy were to arise. Such a spirit would be inconsistent with the character of the teaching and with that religion of the household which, while it is hoped that it retains all the warmth of zeal and the strength of earnest convictions, should yet be the parent of love for all, and which therefore seeks rather to attract than to repel those who, although their opinions are not at all points in harmony, are yet, as we trust, partakers of a common hope and waiting servants upon a common Lord.

The religious instruction, given by the Hon. and Rev. Robert Eden, and by the chaplain and the domestic services of the household, have been attended by all, and they are deemed essential features of the course of instruction and training through which the students pass.

Mr. Hunter also gives instruction in English grammar, etymology, and the History of England.

In English grammar, the principles of Mr. Maculloch's work have, for the most part, been adopted: some portions of it, particularly his definitions, have been simplified; but his classification of the pronouns, his resolution of the tenses of verbs (e. g. *I shall write* being explained as equivalent to *I purpose to write*), &c., have been adhered to.

The instruction in etymology has been given partly by the use of Wood's Etymological Manual, with catechetical lectures thereon; but it has been more frequently founded on words occurring in the usual course of English reading, the teacher, for example, giving the meaning of some words etymologically related to those occurring in the reading-lesson, and the pupil being requested to give the word, whose interpretation has been thus announced: the meaning is given as literally and etymologically as conventional usage will allow, and frequently the pupil has been called upon for a short sentence exemplifying that usage.

THE TRAINING SCHOOL, BATTERSEA.

SCHOOLMASTERS.

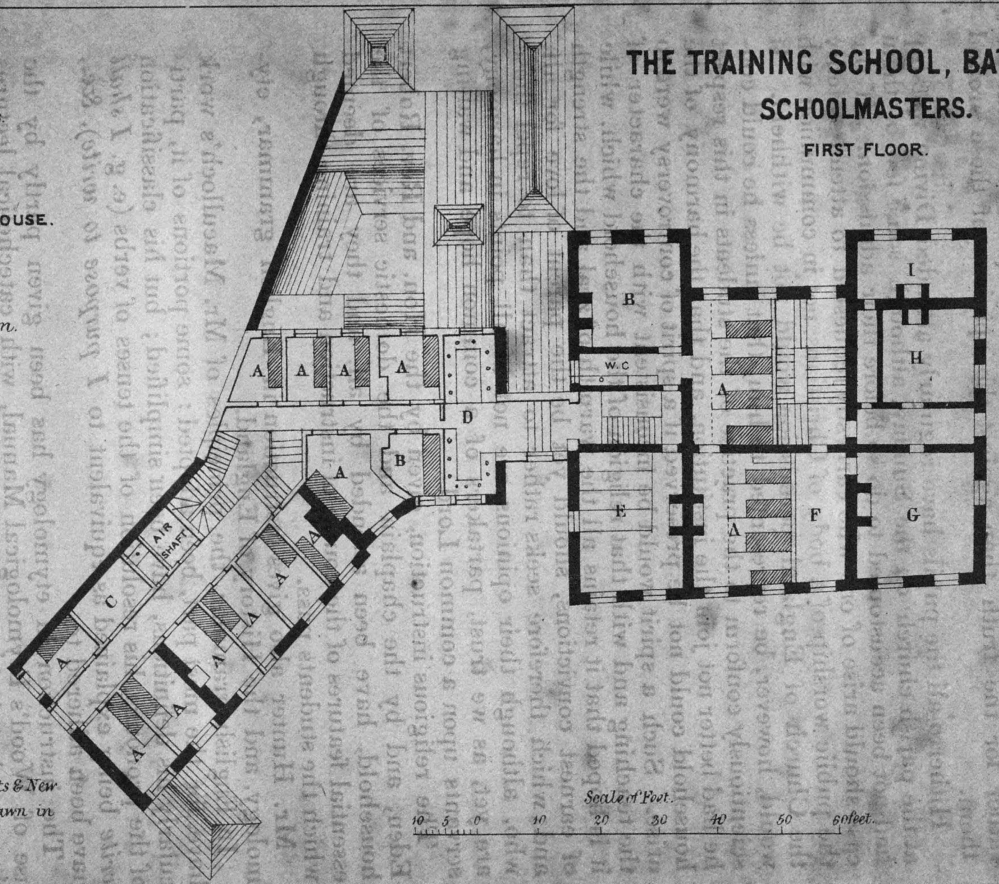
FIRST FLOOR.

SCHOOL.

A. *Dormitories.*
B. *Master's Bed rooms.*
C. *Store room.*
D. *Washing room.*
E. *Class room.*

PRINCIPAL'S HOUSE.

F. *Dressing room.*
G. *Bed room.*
H. *Bed room.*
I. *Servant's Bed room.*



N.B. The Improvements & New Buildings are drawn in outlines.

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THE TRAINING SCHOOL, BATTERSEA.

SCHOOLMASTERS.

GROUND FLOOR.

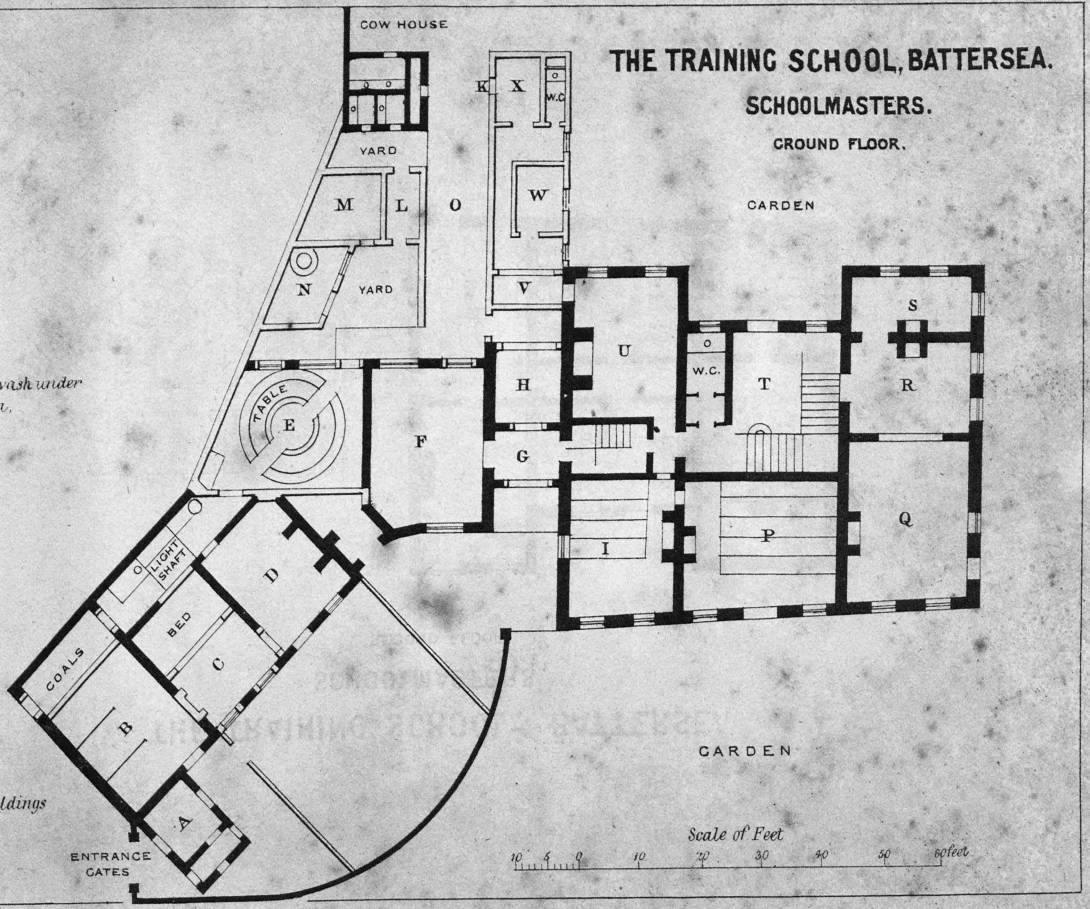
SCHOOL.

A. *Stewards Office*
B. *3 Stall Stable*
C. *Housekeeper's Apartments*
D. *School Kitchen*
E. *Dining Hall*
F. *Class Room & Laboratory*
G. *Entrance*
H. *Lobby for Hats &c*
I. *Class Room*
K. *Coal Shoot*
L. *Knife House*
M. *Coals for School*
N. *Shoe Room*
O. *Covered Shed for Students to wash under on return from the Garden.*

PRINCIPAL'S HOUSE.

P. *Principal's Lecture-room*
Q. *Drawing Room*
R. *Dining Room*
S. *Study*
T. *Hall & Staircase*
U. *Kitchen*
V. *Scullery*
W. *Pantry*
X. *Coals*

NB. The Improvements & New Buildings are drawn in outlines.



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Minutes of Committee of Council on Education 1842-3.

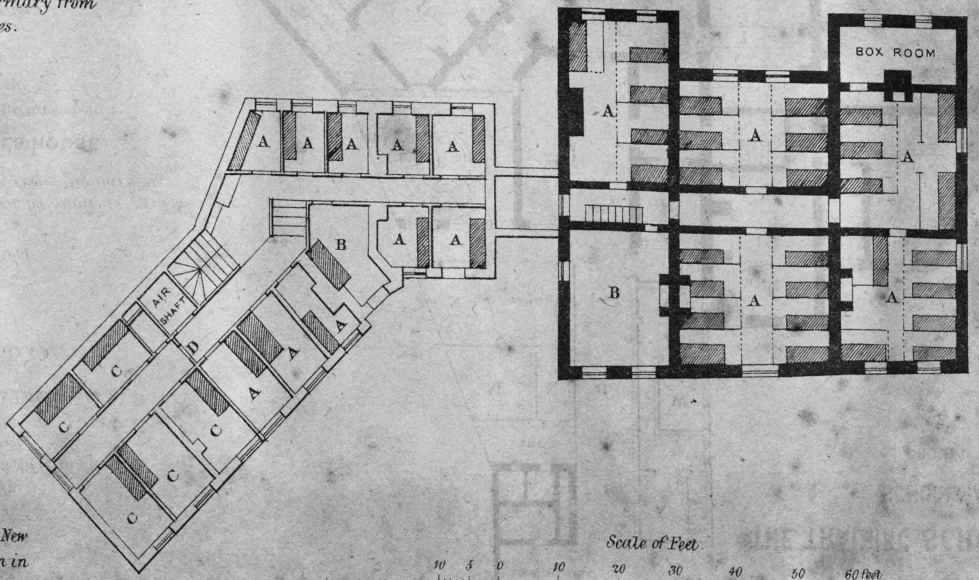
THE TRAINING SCHOOL, BATTERSEA.

SCHOOLMASTERS.

SECOND FLOOR.

SCHOOL.

A. *Dormitories*
B. *Masters Bed-rooms*
C. *Rooms which may be used as an Infirmary when required.*
D. *Door separating Infirmary from Common Dormitories.*



N.B. The Improvements & New Buildings are drawn in outlines.

Scale of Feet

10 5 0 10 20 30 40 50 60 feet

Standidge & Co. Litho: London.

Minutes of Committee of Council on Education 1872-3.

In the History of England, the outlines published by the Christian Knowledge Society have been read, and recently Gleig's School History of England has been introduced. These readings are followed by oral examinations, both as to the contents of the lesson and as to the structure of the sentences and the etymological meaning of the words. Similarly, and as subsidiary to Mr. Hughes' Lectures on Geography, Professor Sullivan's "Geography Generalised" has been used as a lesson-book until a work on geography, now in preparation for the use of the pupils, and which it is expected will form a well methodised hand-book for elementary schools, can be published.

Hitherto the arithmetic, in which the pupils are very expert, has also been under the teaching of Mr. Hunter.

General Principles.

Before proceeding to state the course pursued with respect to other studies, it is necessary to remark, generally, that the chief instruction of the establishment is communicated orally, with comparatively little assistance from text-books. The general view on which this system has been adopted by the Directors is, that it is important that the master should ascertain continually that the pupil is not charging his memory with a formula of words before he is familiar with the principles which it embodies; and that it is especially necessary with a class of pupils who are almost without instruction before their admission, and therefore unaccustomed to the exercise of their mental powers, to cultivate their almost dormant faculties by a continual training in which the master takes a part. It is thought that the faculties which have grown stiff and contracted, for want of activity, may be thus more certainly trained to the gradual development of their forces than if they made the necessary efforts without the constant guidance and assistance of the master. On the other hand, the limited period which can be devoted to the course of instruction renders it indispensably necessary that every precaution should be employed that the pupils are at every step not deceiving themselves with mere formal acquisitions of words, but are laying up a store of thoughts and principles whose reproductive energy they will afterwards discover. On this account text-books are employed almost solely for purposes of recapitulation; and those which are used generally embody but imperfectly the substance of the lectures and lessons which are delivered. On leaving the establishment the pupils are recommended to purchase a small library of text-books with which to pursue the studies they have commenced.

Mensuration, algebra, mechanics, especially the powers combined in the steam-engine; some problems in nautical astronomy, and the explanation of natural phenomena, in connexion with an

elementary knowledge of the laws of chemistry and natural philosophy, are the province of Mr. Tate.

In algebra the pupils are taken as far as the solution of cubic equations, and the summation of series.

In the other subjects, through the kindness of Mr. Tate, I was furnished with the following syllabus:—

Mechanics. The laws of motion—descent of bodies by the force of gravity—composition and resolution of forces.

The Lever. Equation of equilibrium, taking the weight of the lever into account—virtual velocities as applied to the lever—oblique lever—equality of moments.

The Pulley. Advantage gained by taking the weights of the pulleys into calculation—principle of virtual velocities as applied to the pulley. The other mechanical powers are gone through in a similar manner.

Further application of the composition and resolution of forces.

Pressure on beams and tension of cords.

Centre of Gravity—considered in relation to rectangular co-ordinates of bodies in the same as well as in different planes.

Elements of Machinery. General objects of—different modes of distributing motion, regulators of motion—Governors, contrivances for changing the *direction* of motion—for changing the *kind* of motion—for changing the *velocity* of motion. Work done always equal to the force applied.

Work. Units of work in raising a given weight in opposition to gravity—units of work in raising a given weight up an inclined plane, not taking friction into account—units of work in raising structures—units of work in transporting materials on common roads—first on a level road—secondly on an inclined plane, taking the resistance of friction as a certain part of the gross load—similarly—units of work performed by railway trains—cost of excavation, and transport, by means of barrows. Horse powers of a steam-engine, working at an average pressure—units of work, &c., in pumping mines—units of work, &c., performed by water wheels moved by a stream, having a given velocity and fall—given the duty of an engine to find the expense of performing any given work.

Natural Philosophy. In teaching this subject, inductive methods of proof have almost invariably been employed. Whilst the most important phenomena have been exhibited experimentally, those principles only were selected for explanation which appeared to illustrate some one of the operations of nature or processes of art. Without attempting any abstruse mathematical investigations, it is hoped that valuable practical calculations have been given where the subject admitted of such application. The following may be taken as a brief outline of the course of lessons:—

Non-elastic Fluids. Fundamental properties of—illustrations of transmission of pressure—levelling—Artesian wells—Bramah's press—pressure of water due to gravity—proportional to the depth—pressure on the sides of vessels—centre of pressure—hydrostatic bellows—weight of embankments necessary to equilibriate pressure—specific gravity—floating bodies—metacentre.

Elastic Fluids. Properties of the atmosphere and other gases—pres-

sure inversely as the volume—diffusion of gases—air pump—condenser —barometer—syphon—gauge.

Hydraulic and Pneumatic Engines. Common pump—forcing pump —fire-engine — syphon — reciprocating springs—Archimedes' screw— Barker's mill—diving bell—pneumatic trough—gasholder—effects produced by the instantaneous destruction of motion in fluids illustrated—the hydraulic ram,—and water wheels.

Heat. Laws of—thermometer—differential thermometer—compensation pendulum—form of bodies altered by variations in temperature—latent heat—vaporization—expansion of elastic fluids under an increase of temperature—specific heat—radiation—tops of mountains colder than the plains—evaporation—ventilation.

The Atmosphere considered in relation to climate and weather. Winds—dew point—clouds, fog, rain, &c. Huttonian theory of rain—mountains and winds the great agents in the production of rain—why mountains produce rain, &c.—the barometer considered as a weather gauge.

Steam-engine and Labouring Forces. Short history of the steam-engine—leading parts of Watt's double-acting steam-engine—laws of heat applied to steam—units of work performed by a cubic foot of water in the atmospheric engine—labouring force of steam with a mean pressure—duty, &c., of steam-engines considered under various relations—advantages of working steam expansively—demonstration of Thomas Simpson's rule for finding the contents of a solid, bounded on one face by a curved surface,—application of this rule to the calculation of the units of work performed by steam working expansively—labouring force of locomotive engines arising as well from the co-efficient of friction as the inclination of the rail—Pambour's theory of the steam engine. (This last remains to be considered.)

Chemistry. Properties of bodies, primary and secondary—particular notice of some of the more important ones—attraction—gravitation—cohesion, as distinguished from chemical affinity—extreme divisibility of matter shown in metallic solutions — porosity—compressibility—elasticity—Marriott's experiment—chemical affinity—single and double elective affinity—laws of combination—chemical nomenclature—symbols —doctrine of equivalents—equivalents of more common simple substances and compounds with each other—water—composition of—the atmosphere—analysis of—properties of the component gases—oxygen —preparation of, from peroxide of manganese and chlorate of potassa—carbonic acid—properties and preparation of—how detected in water—found in mines—expired by animals—occasional impurities in atmosphere. Chlorine—properties of, &c.—carburetted hydrogen common gas—fire damp—Davy's lamp.

Globes. Arguments proving the rotundity of the earth—solar system —rotation of the earth on its axis—magnitude of the earth, by measuring a degree upon the meridian—method of determining longitude and latitude at sea—problems on the same—proof that the elevation of the Pole is the latitude of the place—Ecliptic—and signs of the Zodiac—origin of the lines upon the globe—causes of the seasons—the meridian elevation of the sun at any place depends upon his declination—problems on the same—method of finding the length of the day on the globe —show by a simple observation how the inclination of the ecliptic may

be determined—the moon's phases—explanation of the difference between a synodical and periodical month—the tides—distribution of temperature on the earth—the atmosphere—refraction—twilight.

Mensuration. Areas of rectangles by decimals and duodecimals—areas of triangles, given the perpendicular and base—and also when the three sides are given—areas of trapeziums, given the diagonal and perpendiculars—areas of trapezoids—areas of right-lined irregular figures—Thomas Simpson's rule for calculating irregular figures—given the two sides of a right-angled triangle to find the hypothenuse,—the hypothenuse and side to find the remaining side—given the two sides of a right-angled triangle to find the perpendicular upon the hypothenuse—given the diameter of a circle to find the circumference—and the converse—areas of sectors, &c.

Solids. Contents of rectangular solids, cylinders, cones, rectangular wedges—contents of irregular solids, by Thomas Simpson's rule—contents of railway cuttings, by Professor Moseley's formula—contents of a sphere, given the diameter, &c. These rules have been applied in finding the cost of pavements, walls, floors, timber and joists, &c.

The modes by which these subjects are taught are eminently practical. Nothing surprised me in the Institution more than the skill with which Mr. Tate had (if I may use the expression) ground down some very difficult problems in mechanics, so as that they might be clearly and easily apprehended by such as were masters simply of the ordinary processes in arithmetic. In addition to great mathematical attainments, Mr. Tate possesses a rare facility of communicating his stores of practical knowledge by degrees, and in logical sequence, so as that each step in the working, while it is distinctly brought forward to the pupil's notice, is seen to connect itself naturally with what has been previously acquired. For the modes in which he has solved some of the problems connected with the work done by the steam-engine, and in some other departments of mechanics, he gratefully acknowledges the aid received from Professor Moseley, of King's College; and in my examinations on these subjects, I must have confessed myself to be at a loss, had it not been for help most readily and kindly given by the same distinguished teacher, both in the framing of my questions and in ascertaining the merits of the answers sent into them by the pupils.

The advantages to be derived to our parochial schoolmasters from the knowledge of mechanics, and especially of the principles on which the steam-engine is constructed, and of the calculations applicable to its agency, have been stated in the printed Report of Mr. Kay Shuttleworth and Mr. Tufnell with a force and distinctness that leave me nothing to add. Indeed a mere glance at the questions proposed by Mr. Tate to his pupils as they are printed in the Appendix, must convince those acquainted with our mining and manufacturing districts that the practical principles embraced in his teaching possess the highest commercial value as branches of industrial knowledge; while to those who regard

simply the intellectual training of the labourer, it must be obvious that he will be more readily led to exercise thought and judgment upon the matters before him, by finding the principles of knowledge acquired at school directly applicable to the employments of his working-day life.

Art of Teaching.

The functions of Mr. Walter Macleod (who for want of a comprehensive phrase already in use, appropriate to the part assigned to him, has been styled Master of Method) have recently been enlarged.

In the training school, it is his office to give instruction as to the modes of teaching the following subjects :—

1. Arithmetic, after the method of Pestalozzi, from a Manual prepared by Mr. Tate.
2. Writing, after the method of Mulhauser, according to the Manual published under the sanction of the Committee of Council on Education.
3. The Phonic method of teaching to read, by a Manual about to be published under the same sanction.

Further, as superintendent of the village school, he takes notes of the teaching of the students employed by him there in each branch of instruction, which furnish materials for lessons in the art of teaching afterwards delivered in the Normal School.

The gallery lessons from objects, as well as those in biblical instruction, are made the subject of special critical remarks among the students in his presence. Instruction is added as to the selection of subjects and the modes of treating them for future lessons.

While Mr. Macleod is engaged in giving these lessons in the training school, the village school is left in charge of one of the students, who superintends the teachers in their instruction of the classes intrusted to them. The superintendent is thus gradually accustomed to the responsibility and general management of an elementary school.

Not only, therefore, is it Mr. Macleod's duty to make the pupils familiar with the methods of conveying elementary instruction to young children as aided by the Manuals alluded to; he has also to teach the pupils to resolve the more technical knowledge apprehended by them on other subjects into its simplest elements, so as to enable them to convey it in a synthetic order to the children of the village school. His instruction embraces, moreover, the general principles of school management, and the particular modes of organization adopted in the best elementary schools; reference being continually had to the pupils' own efforts in the classes and as general managers, and their comments on each other are encouraged for the purposes of mutual improvement.

Mr. William Hughes, one of the professors of the College for

Civil Engineers, gives lectures on geography. He has been good enough to furnish me with the following outline of his course of instruction:—

The entire course occupies one year, a lecture (or examination) of one hour's length being given on three days in each week: the whole number of lessons is therefore 156. These are arranged in the following manner:—

		Lessons.	
First quarter (January to March, inclusive).	Geography of Europe . .	26	
,, ,,	,, Palestine .	4	
		— 30	
	Leaving for Examination .	9	
			— 39
Second quarter (April to June).	Geography of Asia	22	
,, ,,	,, Palestine, &c. . . .	8	
		— 30	
	Leaving for Examination .	9	
			— 39
Third quarter (July to September).	Geography of Africa	14	
,, ,,	,, Australasia and Polynesia . . .	8	
,, ,,	,, Palestine . . .	8	
		— 30	
	Leaving for Examination .	9	
			— 39
Fourth quarter (October to December).	Geography of America . .	22	
,, ,,	General recapitulation . .	6	
,, ,,	Palestine (recapitulatory) .	2	
		— 30	
	Leaving for Examination .	9	
			— 39

The instruction in the geography of each of the great divisions of the globe, as of Europe, consists,—*First.* Of a general and connected sketch of its *physical geography*, including its mountains, plains, lakes, rivers, distribution of useful metals and minerals, climate, and principal productions of the vegetable and animal kingdoms.

Second. Of a particular description of each of its national divisions, embracing, 1st, *a more detailed notice of its physical geography;* 2ndly, *the leading industrial pursuits of its inhabitants* (whether pastoral, agricultural, manufacturing, or commercial,) traced in connexion with, and as they result from, its physical geography; and 3rdly, *the localities of commerce and industry*, including the principal manufacturing towns, seaports, and other places of importance. Incidental notices of any subjects of geographical importance, relative either to the country or the people, are given in connexion with the above, with the requisite statistical details, &c.

The geography of Palestine is particularly described in each of the quarters, on account of its importance as a leading branch of instruction in the elementary and village schools. This country is described both with regard to its physical geography and the other subjects above specified, and also with reference to the numerous Scriptural sites which the country contains, with illustrations of their past and present condition. In connexion with Palestine, the Scriptural Geography of Asia Minor (and the other countries of frequent mention in the Bible) is also described, particularly with reference to the journeys of St. Paul and the early diffusion of Christianity, with notices of the Seven Churches, &c.

These subjects are more fully dwelt upon in the second and third quarters than in the first and fourth, as may be seen by the greater number of lectures allotted to them in those portions of the course.

The pupils are divided into two classes; the instruction given to the second class is throughout of a more elementary character than that of the first, but the same general system is pursued with each.

The music is under the superintendence of Mr. E. C. May, who attends for that purpose at the training institution, twice a-week.

Results.

The attainments of the pupils in these respects, with the exception of music, in which I am not competent to examine, and Mr. Macleod's department, which has but recently attained its full development, will (as I hope) be sufficiently exhibited in the following Tables. These embrace the questions set by me at the close of last November and March,* together with an estimate of the value of the answer given by each pupil to each question, classed under three degrees of merit, A, B, and C. The pupils are designated by figures, which severally represent the same individuals throughout both examinations; the age of each pupil, as well as his standing in the institution, are shown in the tabularized results of the first paper. In the mathematical papers, the letter A marks a full and perfectly accurate solution to the question, as given by that pupil under whose figure it occurs. The detection of the slightest error degraded the value of the answer into the class B. The class designated by C necessarily includes various degrees of merit; in the Mathematical Papers, the results comprised under it at first sight appeared wide of the truth; on examination, however, these were frequently found to contain correct expressions, the failures in such cases having arisen from arithmetical errors. The values of these characters as applied to answers that do not involve calculation, cannot be exactly defined. While generally, it may be stated, that the best answers are marked A, and that those which seem to have any merit, however small, are marked C; an answer rendered faulty by an error of statement, or an explanation, correct as far as it goes, but in some respect deficient, has been characterized by B.

* It should be noticed that, through the kindness of a friend (Dr. Miller of King's College), I was furnished with some questions on chemistry that were set in my first examination, but as it proved difficult in so large a subject (of which necessarily the pupils at Battersea, from the number of their pursuits, could receive only general impressions) exactly to hit the several points to which attention had been directed, I have not in this instance taken the pains to tabularize the results obtained.

ABSTRACT OF THE RESULTS OF THE EXAMINATION.

NOTE.—The letters A, B, C, mark different degrees of merit in the answers, as explained in the body of the Report A marks the highest merit.

SENIOR DIVISION.

PURE MATHEMATICS.—November 24, 1842.—Three Hours.

Age of each Pupil . . .	Years	18	14	16	15	18	17	16	18	15
	Months	1	9	6	8	..	6	6	6	..
Standing in the Institution	Years	2	2	2	2	2	1	1	2	2
	Months	9	9	4	..	5	..	10	3	9
Figure characterizing the Pupil . .		3	2	5	7	4	9	8	6	1
1. Find the value of 137 at 1*l.* 7*s.* 6½*d.*		A	A	A	A	A	A	B	B.	B
2. Find the interest of 547*l.* 15*s.* for three years at 5 per cent.		B	A	A	A	A	A	C	B	A
And find the present value of 450*l.* due in three months at 5 per cent. .		..	C	A	C	B	B	C	A	A
3. Extract the square root of 47585·059		B	A	A	A	B	A	B	A	A
And the cube root of 9938375		..	..	..	B	..	..	..	A	..
4. Express 19*s.* 5½*d.* as the decimal of a pound		A	..	A	A	A	C	B	C	C
5. If 8 men build 24 square yards of walling in 6 days, how many will build 18 square yards in 3 days?		A	..	..	A	..	A	A	..	..
6. Divide $12x^5-13x^4-34x^3+35x^2$ by $4x^2-7x$, and		A	A	A	A	A	A	A	A	A
$\frac{x^3}{3}+\frac{11x^2}{6}-\frac{7x}{9}+\frac{4}{3}$ by $\frac{x}{3}+2$.		B	A	A	..	B	C	A	A	..

7. Expand $(a+x)^7$	A	A	A	A	A	A	A	A	A
8. Solve the following equations: $5x^2+4x=273$	A	..	B	C	..	B	A	B	C
$xy=1+2y^2$ and $x^2+xy=12$	..	..	..	..	..	..	A	A	..
9. A certain number of sheep cost 57*l.*, 8 die, the remainder being sold at 8*s.* a-head profit produce 57*l*, how many sheep were bought?	..	..	..	..	C	..	..	..	..
10. Find the sum of 10 terms of the series 3; 6, 9, &c.	..	A	..	A	..	..	A	A	A
Also find the vulgar fraction corresponding to the recurring decimal ·123123, &c.	..	A	..	..	..	..	A	..	C
11. Show that parallelograms on the same base and between the same parallels are equal	..	A	..	..	..	B	..	..	A
12. Find the radius of a circle where 6 inches is the length of the versed sine of the arc whose chord is 1 yard	..	A	A	A	A	..	B	A	A
13. Show that $\sin(A+B)=\sin A.\cos B+\cos A.\sin B$	..	..	..	..	..	..	..	..	A
14. A man distant 70 feet from the foot of a tower observes it to subtend an angle of 60°, his eye being on a level with the ground, find the height of the tower	..	C	B	A	C	..	B	A	C
15. Write down the equation to the circle, taking $2a$ for the diameter, and making the extremity of the diameter the origin of co-ordinates	..	..	..	..	..	..	..	..	C
16. What are the chief properties of the parabola?	..	..	..	..	..	..	A	A	C
17. How may an ellipse be described practically?	..	..	..	..	..	..	..	A	A
18. Find the area of a field of four sides, two of its sides being parallel, the lengths of these respectively 230 and 480 yards, and their distance 800 yards	A	A	A	..	A	A	A	A	A

SENIOR DIVISION.

RELIGIOUS INSTRUCTION.—November 25, 1842.—Three Hours.

Figure characterizing the Pupil . .	1	2	3	4	5	6	7	8	9	17	23	24	27	28	29	30	31	32
1 What is true repentance ?*	A	A	B	B	A	A	A	A	B	..	A	A	B	A	A	A	A	C
Give passages from Scripture on which you ground your answer*	A	C	C	B	A	B	B	A	B	..	A	B	B	C	B	A	A	..
2. In what sense, and to whom is our Lord's yoke easy ?*	B	A	C	..	C	B	..	B	..	..	B	B	A	B	A	A	A	C
3. Show that we cannot expect forgiveness unless we forgive others	A	B	C	C	A	B	A	A	A	A	B	A	A	A	A	B	A	A
4. Give any prophecies that occur to you, showing how our Lord was to be born	A	A	..	A	A	..	A	A	C	A	A	B	B	C	A	A	A	A
What he was to do	A	C	..	C	A	..	B	A	..	C	A	B	..	C	A	B	..	B
How and what he was to suffer. . . .	A	B	..	C	A	..	B	A	B	A	A	A	..	A	A	B	A	..
5. Show from Scripture that we need spiritual help at all times*	B	A	B	A	A	B	A	A	..	A	B	A	B	A	A	B	B	A
And that every act rightly done may be an act of devotion towards God	..	..	..	A	A	..	C	..	..	A	..	B	..	..	A	..	..	..
6. *Ask and it shall be given you,* in what sense is this promise unconditionally true ?*	B	B	C	B	A	C	C	A	C	..	B	B	C	B	B	B	B	C
In what respects is it limited by other passages of Scripture ?	..	B	..	B	B	..	C	B	C	..	B	B	C	C	B	B	B	C
7. On what occasion was the parable of a new piece sown on an old garment given ?	..	..	..	..	A	..	..	A	..	..	..	..	..	..	..	..	..	..
What do you learn from it ?	..	..	..	..	B	..	C	..	..	..	..	..	..	..	..	..	A	..

8. Mention any parables in St. Matthew's account which show our Lord's foreknowledge of the effects that would be produced in the world by the preaching of the Gospel, ...	A	..	..	..	C	..	C	B	C	C	A	B	..	C	C	C	A	A
9. Give in round numbers the dates of the following events —																		
The birth of Abraham	A	A	A	..	A	..	..	B	..	A	..	..	A	..	B	..	A	B
The Exodus of the children of Israel. . .	B	A	A	..	A	..	..	A	..	A	..	..	A	..	B	..	A	C
The accession of King Solomon. . . .	A	B	A	..	A	..	..	A	..	..	..	..	B	..	B	..	B	A
The return from the 70 years' captivity .	A	..	A	..	B	..	..	B	..	..	..	..	A	..	B	..	B	B
The destruction of Jerusalem. . . .	A	B	A	..	A	..	..	..	A	..	A	..	A	..	..	..	B	..
10. Give examples from the Bible of the names of *persons* and	A	A	..	B	B	..	B	B	B	B	C	B	B	C	B	C	C	..
Places being changed, with the import of the new names given	A	A	..	B	B	..	B	B	..	C	C	..	..	C	..	C	C	..
11. Give some of the chief names and titles ascribed to our Blessed Lord in the Scriptures,* and show their significancy and fitness	A	A	A	B	B	A	A	..	A	A	A	B	B	B	B	B	A	C
12. Give a short account of the lives of—																		
Gideon	..	..	..	..	B	..	..	..	..	..	..	..	..	..	B	..	C	C
Elijah	..	B	..	A	..	..	..	A	B	..	B	A	B	..	B	B	B	A
Hezekiah	..	.	..	..	..	..	..	..	..	..	..	..	..	..	B	..	..	C
Philip the deacon	..	C	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13. Show briefly from Scripture what Christ, as our High Priest, hath done and is doing for us, with the corresponding duties on our part* . . .	B	..	C	A	B	C	B	C	A	B	B	A	B	B	B	B	B	C
14. Give from Scripture encouragement to transgressors to go back to God*	A	B	A	A	..	..	A	A	B	A	A	A	..	B	A	A	A	..

Particular attention to be paid to those questions marked *.

SENIOR DIVISION.

GEOGRAPHY.—November 29, 1842.

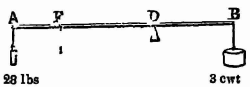
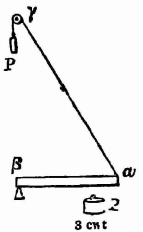
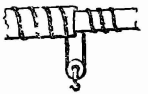
Figure characterizing the Pupil	3	1	6	2	7	8	5	4	9
1. Give a description of the general aspect of America	C	A	B	B	B	A	A	B	B
What points of resemblance are there between its two Continents?	..	A	A	..	..	A	A	A	A
What are its chief table-lands?	..	B	A	B	..	B	A	..	C
Mark the directions in which the chief lines of drainage fall	..	A	A	A	..	A	A	B	B
2. Give some of the distinguishing features of the Andes	..	B	B	..	..	B	B	B	B
What is their greatest elevation?	..	A	..	..	..	B	A	A	A
3. What is known of the physical geography of Australia?	..	B	B	B	B	C	B	B	B
Give some account of its original inhabitants	..	C	C	C	B	B	B	C	C
4. What is the present political condition of Palestine?	..	B	..	C	..	B	B	B	C
5. Give a general description of the chief physical features of the Holy Land	B	A	C	A	A	B	C	B	B
Do these in any respect differ from the state of things spoken of in Holy Scripture?	..	A	..	A	A	A	A	..	B
How do you account for this difference?	..	A	..	A	A	A	A	..	B
6. Give a sketch of the journey of St. Paul	..	B	..	A	..	..	..	..	A
7. Give some account of the progress of geographical discovery within the Arctic and Antarctic Circles	C	C	..	..	..	B	..	B	B
8. Who have been the chief discoverers among the Dutch and French voyagers?	..	C	..	C	..	B	..	..	..
Mention the locality of the labours of each	..	C	..	..	..	..	..	..	..
9. Specify the locality of the chief mineral productions of Europe	..	A	B	C	A	B	A	..	C
Noting more particularly those of the British Isles	..	A	B	B	B	B	A	..	B
10. How do the great mountain ridges of Asia lie?	..	A	A	B	A	C	B	..	..
Mark the outlets of its chief rivers	..	A	B	B	A	B	A	..	..

STEAM ENGINE.—December 1, 1842.

Figure characterizing the Pupil. . . .	1	2	3	4	5	6	7	8	9
1. Find the horse-power of an engine that will raise 100 cubic feet of water per minute from a depth of 600 feet	A	C	A	A	A	B	B	A	A
2. Find the power of an engine that will sustain the motion of a train weighing 50 tons at 20 miles per hour (Friction 8 lbs. to the ton)	A	C	..	A	A	A	A	A	..
3. Find the power of an engine, the pressure on the piston being 10 lb. per square inch, the elasticity of steam in the condenser 2 lb per square inch, the piston 5 ft. in diameter, stroke 6 ft. 15 single strokes per minute	C	C	..	B	B	B	A	A	C
4. How many bushels of coals will raise 150 cubic feet of water per minute, the depth of the shaft 100 fathoms, the day 24 hours the duty of the engine 60,000,000	A	C	C	C	A	A	B	A	..
5. From what depth can I raise a weight of 6 cwt. with a rope 4 inches in circumference in 6 minutes with 3 horse-power (weight of 1 foot of rope 1 inch in circumference, ·046)	C	C	C	C	B	B	A	B	..
6. Steam is admitted into the cylinder of a steam-engine at an effective pressure of 30 lb. per square inch, the area of the piston 100 inches, length of the stroke 10 feet, steam is cut off at 2 feet, required the units of work performed by one stroke . . .	B	A	B	A	B	B	A	B	C
7. Describe the chief parts of the double-acting steam-engine. . .	B	C	B	B	B	B	B	A	B

SENIOR DIVISION.

MECHANICS, HYDROSTATICS, AND NATURAL PHILOSOPHY.—November 30, 1842.—Five Hours.

Figure characterizing the Pupil	1	2	3	4	5	6	7	8	9
1. Solve by Cardan's rule the equation $x^3+15x^2+84x-100=0$ . .	..	..	..	..	..	B	..	..	..
2. A. B. is a lever without weight 16 ft. long, 28 lb are hung at A, 3 cwt. at B. DB=6ft, DE.=7 ft.; find the weight necessary at E to produce equilibrium . . . . . 	A	A	A	A	A	A	A	A	A
3. α β is a cylinder of iron in a horizontal position, each foot of its length weighs 10 lb, its length=12 feet. At γ (15 feet vertically above β) is a pulley, 3 feet from the extremity α, is suspended a weight of 3 cwt, find the power which, attached to a line passing from extremity α over the pulley at γ, will keep the cylinder horizontal 	B	B	..	..	..	A	C	C	..
4. Find the advantage gained in an axle of two different thicknesses, the diameters being respectively 3 and 4 inches, the string coils round in opposite directions; the power acting at a distance of 9 inches from the centre . . . . . 	C	..	A	..	C	A	C	C	B
5. Explain the reason of the conical shape of the fusee of a watch	B	..	..	..	..	..	C	..	..

6. A body falls from the top of a tower 350 feet high, at the same instant another body falls from a window in the tower 50 feet from the top, find the times in which each reaches the ground to two decimal places of seconds	A B	A A	C C	.. ..	A A	B A	A A	A A	A A
7. Define the centre of pressure	A	C	..	..	A	A	A	B	..
Show where its position will be, and	A	C	..	..	..	A	A	C	..
Find the whole pressure on a rectangular floodgate 36 feet deep, 12 feet wide, when the water comes to the brim	A	C	..	..	A	A	A	..	..
8. The weight of a vessel full of distilled water is 9 lb. 7 oz., a body whose weight is $10\frac{1}{2}$ oz. being immersed, the whole weight is 9 lb. $7\frac{3}{4}$ oz, find the specific gravity of the body immersed	C	..	..	B	B	A	..	C	..
9. Describe Bramah's press, and	A	B	A	B	A	A	A	B	B
Find the advantage gained when the smaller piston acts at $1\frac{1}{2}$ inch from the centre of motion, the power acting at 12 inches, the diameter of the smaller piston $\frac{1}{2}$ inch, that of the larger 10 inches	C	..	A	A	A	C	A	C	C
10. A vat 12 feet in diameter closed at top and bottom that would burst under a pressure of 9 tons is filled through a pipe passing into the top, how high may the pipe be carried with safety?	A	C	C	C	..	A	A	..	..
11. Describe the barometer explaining the principle on which it acts	B	..	..	..	A	B	A	B	B
What are its uses?	B	..	..	..	A	A	A	B	B
12. Show by a drawing the mode of action in the fire-engine	A	B	B	..	A	A	A	C	B
13. Explain the differential thermometer.	B	..	..	B	A	..	...	B	..
14. Mention briefly the chief properties of elastic fluids, notice also some of the most familiar effects of the elasticity of the atmosphere	A	B	C	..	B	A	..	B	A
15. Give Dr. Wells's theory of dew	B	..	..	A	C	B	..	A	C
16. Explain why the tops of mountains are colder than the surrounding lowlands	A	C	..	B	A	B	..	A	B

ARITHMETIC.—November 23, 1842.

Age of each Pupil	Years	17	15	22	17	20	15	18	17	13	16	21	27	27	25	22	15	19	16	15	15	26	22	14	22
	Months	9	6	..	6	..	..	..	..	..	..	9	10	..	..	9	8	..	..	..	..	..	..	..	9
Standing in the Institution . .	Years	2	2	1	1	1	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Months	2	..	8	6	3	2	1	1	..	11	9½	9	9	9	8	8	6	6	5	4	3	3	2	¼
Figure characterizing the Pupil . . .		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1. Multiply 97424 by 72.		A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
And 62473864 by 27356		A	..	..	..	..	B	C	..	B	B	B	..	..	..	..	..	..	..	A	..	..	..	A	A
2. Divide 3700770 by 878		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C
And 4637064283 by 57606		A	..	..	..	B	..	..	..	B	B	A	..	..	..	..	..	..	..	A	..	..	..	A	B
3. Write down the table of square measure		A	A	A	A	A	A	..	A	A	A	A	A	A	A	A	B	A	A	A	C	A	A	A	C
What is the length of Gunter's chain? how is it divided?		..	..	..	..	..	..	..	..	..	..	C	B	..	A	B	..	..	A	A	..	..	C	..	..
4. Multiply 2*l.* 15*s.* 3½*d.* by 35		A	..	A	A	A	A	C	A	A	B	A	..	A	..	B	..	A	A	A	B	B	A	A	A
5. If tobacco be 18 guineas per cwt., how much will 1 lb. cost?		A	A	A	A	A	A	..	A	B	..	A	A	A	A	A	A	A	A	..	A	A	..	A	A
6. How many yards of matting, 2½ feet wide, will cover a room, 27 feet by 20?		A	..	B	..	B	A	..	A	..	A	B	B	B	B	B	A	A	B	B	C	A	A	A	..
7. If my wages be 27 guineas a-year, how much must I have for 95 days' service?		B	C	A	B	..	A	..	A	..	A	A	B	A	A	A	B	A	A	A	C	A	A	A	A

8. Define a fraction. What does the numerator show; what is marked by the denominator?	A	A	A	..	A	A	..	A	..	C	A	A	A	B	B	..	A	A	..	B	A	C
9. Reduce $\frac{1344}{1536}$ to its lowest terms	A	A	A	B	C	C	A	A	B	C	A	A	A	A	C	A	A	A	A	A	A	A
10. Reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{5}{6}$ to equal fractions, having the least common denominator	A	A	A	A	A	B	..	B	A	A	A	A	A	A	B	A	A	A	A	B	B	A	C
11. Express $\frac{3}{7}$ of a pound as the fraction of a guinea	A	..	A	..	..	..	..	A	..	..	A	B	A	..	A	..	A	A	C	A	A	A	..
12. Reduce the complex fraction $\frac{2\frac{1}{8}}{3\frac{1}{2}}$ to a single one	B	A	A	..	..	B	..	A	..	A	B	C	A	B	B	..	A	A	A	A	A	A	C
13. I own $\frac{3}{4}$ths of a coal mine, and sell $\frac{1}{4}$th of my share for 1710*l.*, find the value of the whole mine	A	..	..	..	..	..	..	..	..	..	A	C	..	..	A	A	A	A	..	..	..	A	..
14. Divide ·48624 by 17·9	B	..	..	C	..	..	..	B	..	..	B	B	..	..	..	A	B	..	C	A	..	B	..
15. Express $\frac{3}{125}$ as a decimal	B	..	B	..	..	..	..	B	B	..	B	B	A	..	..	B	A	B	A	A	..	B	..
16. Reduce 17 yards, 1 foot, 6 inches, to the decimal of a mile	A	..	..	..	..	..	..	A	..	..	B	A	A	..	..	..	A	B	..	A	..	A	..
17. Express ·0625 of a barrel of beer in gallons and quarts	A	C	A	..	..	..	..	A	..	..	A	A	A	..	..	..	A	..	..	A	..	..	..
18. Find the lowest vulgar fraction, = ·026	A	A	A	..	..	..	..	A	..	..	A	A	A	..	..	..	A	..	..	..	..	A	..

MENSURATION, MECHANICS, AND THE STEAM ENGINE.—November 24, 1842.

Figure characterizing the Pupil . .	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1. Find the area of the square described on the hypothenuse of a right-angled triangle, the sides being 7 and 13 . .	..	B	A	..	A	..	A	..	A	B	C	A	A	B	A	A	A	A	A	C	B	A	A	A
2. Construct a triangle the sides of which shall equal 3 given straight lines . .	..	..	..	..	..	..	..	C	..	..	..	..	..	A	A	..	..	..	A	..	..	..	..	..
3. How many solid feet in a slab of marble 12 feet long, 9 feet wide, and 18 *inches* thick	A	A	A	..	A	A	A	..	A	..	A	A	A	B	A	A	A	A	A	A	A	A	A	A
4. Find the area of a triangle, whose sides are 12, 16, and 20 respectively . .	A	..	..	A	..	A	A	A	A	A	..	A	A	A	A	A	A	C	A	A	A	A	A	B
5. The sum of the 3 sides of an equilateral triangle is 27 yards, find its area to 2 places of decimals	..	C	..	..	..	..	A	A	..	..	..	A	..	..	A	A	A	A	A	B	..	A	A	..
6. Find the area of a rectangular floor, the sides being 4 feet 7 inches, and 3 feet 10 inches	A	A	B	..	..	A	..	A	..	B	A	A	..	A	A	B	A	A	A	A	A	A	A	..
7. What proportion does the diameter of a circle bear to its circumference ? . .	A	A	..	A	C	A	..	A	B	..	A	A	A	B	B	B	A	A	A	A	A	..	B	..
8. Give familiar examples of the three sorts of levers	B	B	A	..	B	B	..	A	..	C	C	A	A	B	B	B	A	A	C	..	..	B	..	..

Find the relation between the power and the weight when acting vertically downwards on opposite sides of the fulcrum	B	A	A	..	..	A	..	A	..	..	A	A	A	A	A	A	A	A	A	..	A	A	..	..
9. Explain how a paper kite rises in the air	..	..	..	C	..	..	..	C	..	C	..	..	..	..	..	..	..	..	..	..	C	C	..	..	..
10. How may a person with a watch in his hand ascertain the height of a perpendicular cliff while standing on its summit?	A	..	A	..	C	A	..	A	..	..	..	..	..	A	..	..	..	..	B	C	..	..	B	B
Apply what you say to a particular case .	A	..	A	..	..	A	..	..	..	..	..	..	..	A	..	..	..	..	..	C	..	..	B	B
11. Show on what principle the common steelyard is graduated	..	A	C	..	..	B	..	C	..	..	..	C	..	B	..	..	..	C	B	B	B	C	..	..
12. What is the use of the fly-wheel in a steam-engine?	C	C	A	C	..	C	C	A	C	B	A	B	A	A	B	..	B	..	..	A	A	A	..	..
13. How is the up and down motion of the piston changed into a continued circular motion?	..	..	..	..	..	..	C	A	..	A	A	C	A	A	..	..	B	..	..	..	A	..	..	..
14. Show how a continued circular motion may be changed into an alternating up and down motion	..	B	B	..	..	A	..	..	..	B	..	B	..	A	..	..	..	..	..	B	..	..	A	..
15. Find the relation of the power to the weight in that system of pulleys, when each pulley hangs by a separate string	A	B	B	C	B	A	C	B	C	B	A	B	B	B	B	..	C	B	B	..	..	..	C	..
16. Describe the governor of a steam-engine	A	A	..	C	..	A	..	A	..	C	A	A	A	A	..	..	A	A	..	A	A	A	B	..

JUNIOR DIVISION.

RELIGIOUS INSTRUCTION.—November 25, 1842.—Two Hours and a Half.

Figure characterizing the Pupil	10	11	12	13	14	15	16	18	19	20	21	22	25	26	33
1. Who were the Scribes?	..	A	A	..	..	..	..	B	A	C	A	A	A	A	B
Pharisees?	C	A	B	..	B	..	..	B	..	..	B	A	B	B	A
Sadducees?	B	A	B	..	B	..	..	B	..	..	B	B	B	B	B
and Publicans?	A	A	A	..	B	B	..	B	..	..	A	A	A	..	A
2. What was a synagogue?	B	A	B	..	A	A	..	..	..	C	C	C	..	B	A
Give some account of the first erection and subsequent history of the Jewish temple.	B	A	B	B	B	B	..	B	C	C	C	C	C	B	A
3. Draw a map of Palestine, marking the chief places mentioned in the Gospels	C	B	C	..	C	C	..	C	C	B	B	..	B	C	B
4. What is the meaning and derivation of the words Absolution?	B	..	A	B	A	B	A	A	B	..	A	A	A	A	B
Advent?	B	..	A	B	B	..	B	A	..	..	A	..	B	A	A
Catechism?	C	..	..	B	C	C	B	..	..	..	C	C	..	A	..
Catholic?	A	..	..	B	..	B	..	A	B	..	B	B	A	C	..
Epiphany?	..	..	C	..	A	..	..	C	..	..	B	B	..	..	B
Ghost?	..	..	A	A	B	A	..	C	C	..	A	A	..	C	B
Gospel?	C	..	B	..	A	B	..	..	B	..	B	..	..	..	B
Litany?	..	..	..	..	..	C	..	..	..	..	A	..	..	A	A
Liturgy?	..	..	B	..	C	..	..	..	..	..	A	..	..	..	A
Sacrament?	B	..	A	..	C	..	..	..	..	..	A	..	..	..	B
Testament?	A	..	B	B	C	..	..	C	..	..	A	A	..	C	B
5. What do we learn of St. Matthew from his Gospel?	..	..	..	..	A	C	..	..	C	B	..	..	B	..	A

6. What are the chief matters treated on by our Lord in his Sermon on the Mount?	A	C	B	B	B	C	..	..	C	C	..	C	C	..	B
7. Give some account of the parable of the ten virgins?	A	A	..	A	..	A	B	A	B	B	A	A	..	A	C
What lesson do you draw from it?	A	A	..	A	A	A	B	A	B	..	B	A	A	..	C
8. Give some account of the life of Esau	A	A	C	..	..	..	..	..	..	..	..	..	.	..	B
Saul the King	B	A	C	..	..	..	..	..	..	..	..	..	B	A	B
Saul the Persecutor	A	A	A	A	C	B	..	A	..	..	A	A	..	A	A
St. Peter	A	..	C	A	B	B	..	A	B	..	A	A	A	A	B
9. In what sense is it said that God did tempt Abraham?	..	..	A	A	C	A	..	..	..	..	C	..	B	..	A
10. What did the three great Jewish feasts commemorate?	..	..	B	A	B	..	..	..	..	..	B	B	..	..	C
Do any of the festivals of the English Church correspond to them in time?	..	..	C	A	..	..	..	..	..	..	C	C	..	..	..
or in other respects?	..	..	B	A	..	..	..	..	..	..	C	C	..	..	..
11. Paraphrase shortly the sixth commandment,	..	A	B	..	A	B	..	A	A	B	A	A	A	A	B
and the Lord's prayer	..	A	B	..	B	B	..	..	..	C	B	A	..	..	B
12. What was the ordinary Jewish mode of putting malefactors to death	..	A	A	A	..	..	..	A	B	..	A	A	A	..	..
How came our Lord to suffer crucifixion?	..	A	A	A	C	..	..	A	..	..	A	A	B	..	..
13 Illustrate from Jewish or Roman customs, any passages that occur to you in St. Matthew's Gospel															

GEOGRAPHY.—29th November, 1842.

Figure characterizing the Pupil .	17	22	12	31	30	21	13	27	26	16	18	25	10	32	29	28	14	15	23	33	11	24	20	19
1. Draw a map of America, marking the chief mountain ridges, and the names and directions of the chief rivers . .	..	A	B	B	B	B	A	A	..	C	B	C	A	B	B	B	C	B	A	C	..	B	A	A
2. How are the mountains on the east side of America distinguished from those towards the west?	C	A	B	A	B	A	A	B	..	C	C	B	C	B	C	B	..	C	C	B.	B	C	B	B
3. What is included under the name Polynesia?	B	A	B	B	C	A	B	A	C	C	B	B	B	B	C	C	..	B	B	C	A	B	C	A
4. Give as accurately as you are able the localities of the chief manufacturing and mining population of Great Britain .	A	B	B	A	B	A	B	A	B	..	B	B	..	A	B	B	C	B	B	B	A	A	B	A
5. Give some account of the physical aspect of Ireland	B	C	C	A	B	B	C	C	..	..	C	C	..	C	A	B	..	A	B.	C	B	B	C	B
6. Mention the chief towns on the Severn .	B	..	B	B	C	C	B	B	..	..	..	C	..	..	C	C	..	..	B	..	B	A	B	C
Thames	B	A	B	A	B	A	..	B	..	B	A	B	..	A	B	B	..	..	B	B	A	A	C	A
Buckinghamshire Ouse. . . .	B	..	..	..	..	..	B	..	..	..	..	..	..	..	A	C	..	..	..	..	A	..	..	B
and Tyne	..	A	B	B	A	A	A	A	..	..	B	B	..	B	B	A	..	..	A	B	A	A	..	B
7. Draw a map of England, marking the chief ranges of hills and mountains .	..	B	B	B	B	B	B	C	..	..	B	C	..	B	B	B	..	A	B	C	B	A	B	B
8. Describe the locality of the following Irish towns:—																								
Armagh	B	..	..	B	..	A	C	..	..	..	..	..	..	..	..	..	..	B	..	..	B	B	..	B
Athlone	B	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	B	..	..	..	..	..	B
Belfast	B	..	..	A	..	..	B	..	..	..	B	B	..	B	B	..	..	B	A	C	A	A	..	B
Cork	B	..	..	A	..	A	B	..	..	..	B	A	..	A	B	..	..	B	A	C	A	A	..	A
Drogheda	B	..	..	A	..	B	..	..	..	..	..	C	..	..	B	..	..	..	B	B	C	..	..	A
Galway	B	..	..	A	..	A	C	..	..	..	..	..	..	..	B	..	..	..	A	C	..	C	..	A
Kilkenny.	B	..	..	B	..	A	..	..	..	..	..	C	..	..	B	..	..	..	..	..	B	C	..	A
Limerick.	B	..	..	A	..	B	B	..	..	..	..	A	..	B	B	..	..	..	A	C	A	A	..	A
Londonderry.	B	..	..	A	..	A	B	..	..	..	..	..	..	..	C	..	..	B	A	C	A	A	..	B
Sligo	B	..	..	..	..	A	..	..	..	..	..	..	..	..	C	..	..	..	..	..	B	A	..	B

ARITHMETIC—March 23, 1843

Age of each Pupil	Years	28	18	15	..	16	16	18	17	27	17	16	15	18	25	18	26	15
	Months	2	5	1	..	10	..	4	10	4	4	10	10	10	4	1	4	4
Standing in the Institution	Years	1	3	3	..	2	2	2	1	1	1	2	2	2	1	2	0	3
	Months	1	1	1	..	8	4	9	4	1	5	2	4	7	1	6	7	1
Figure characterizing the Pupil		21	3	2	34	5	7	4	9	22	17	8	11	6	23	10	30	1
1. Multiply 8426357 by 678		A	B	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A
2 Divide 29137062 by 5317		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
3. Find the cost of 42cwt of tallow at 2*l* 16*s*. 5¾*d*. per cwt.		A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4. The shadow of a church tower extends 57 yards from its base, find its height, it being observed that a four-foot staff held perpendicularly casts a shadow of 56 feet 6 inches		A	A	A	C	A	A	A	A	A	A	A	C	A	A	C	A	A
5 Find the value of 7211 at 1*s*. 3*d*		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
6. Reduce $\frac{212}{364}$ to its lowest terms		A	B	A	A	A	A	B	A	A	B	A	A	A	A	A	B	A
7. Add together $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ $\frac{1}{5}$, and $\frac{1}{6}$, and reduce the sum to its lowest terms		B	B	A	A	A	A	A	A	A	A	A	B	A	A	B	B	A
8. Express 17 yds. 1 ft 6 in. as the decimal of a mile		B	A	B	C	B	A	A	A	B	A	A	B	B	A	B	A	A
9 Find the cube root of 576 to 3 decimal places		B	A	A	A	A	A	A	A	A	A	A	B	A	A	B	A	A
10. Find the amount of 690*l* for 3 years at 4½ per cent		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
11. If 2 loads of hay will serve 3 horses for 4 weeks, how long will 5 loads serve 6 horses?		A	B	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A
12. Divide 5678·9 by ·06		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

SENIOR DIVISION.

ADDITIONAL QUESTIONS.—April 3, 1843.

Figure characterizing the Pupil . .	21	3	2	34	5	7	4	9	22	17	8	11	6	23	10	30	1
1. Required the amount of 246*l.* 15*s.* for 3 years, 6 weeks, and 4 days, at $2\frac{1}{2}$ per cent. per annum	A	B	B	A	B	A	A	A	A	C	C	A	A	A	A	B	A
2. Four parties contribute each to a speculation 750*l.* The first withdraws his money after 7 months, the second after 9 months, the third after 11 months; at the year's end the whole gain is 438*l.* Find the share of each . .	A	B	A	B	A	A	A	A	A	A	A	B	A	B	A	B	A
3. Find the sum of $\frac{13}{27} + \frac{19}{23}$ of $9\frac{2}{3} + \frac{11}{33}$ of $8\frac{4}{7}$ . .	B	B	B	B	B	B	B	B	B	A	B	A	B	B	C	B	B
4. Find the expense of covering a room 26 ft. 9 in. by 12 ft. 4 in., with a carpet $\frac{3}{4}$ of a yard wide, at 4*s.* 2*d.* per yard	B	C	B	A	A	A	B	B	C	B	A	C	B	C	..	B	B
5. Mix brandy at 8*s.*, wine at 7*s.*, cyder at 1*s.*, with water, so that the mixture be worth 5*s.* per gallon	A	B	A	A	A	A	B	A	A	A	A	B	A	B	C	A	A

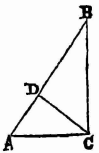
SENIOR DIVISION.

GEOGRAPHY.—March 29, 1843.—2 to 5½ P. M.

Figure characterizing the Pupil .	21	3	2	34	5	7	4	9	22	17	8	11	6	23	10	30	1
1. Give some account of the present condition of Antioch (capital of Syria), Babylon, Bethlehem, Cana, Damascus, Ephesus, Jericho, Joppa, Nazareth, Smyrna, Tadmor, Tiberias, Tyre	B	..	B	B	A	A	A	A	C	..	C	B	C	C	A	..	A
2. Mention the chief mineral productions of Europe, with the localities where they are found . .	A	B	A	A	A	A	A	B	A	B	C	B	C	B	C	B	A
3 Mention the chief manufactures of England, and the districts in which they prevail, with (if possible) some estimate of the numbers directly supported by them	A	B	A	B	A	B	A	A	B	B	C	B	B	B	B	A	A
4. Give some account of the physical features and natural productions of Hindoostan . . .	A	..	C	..	B	A	B	C	C	C	C	B	C	B	B	..	B
5. Draw a map of Scotland, showing the relative position of the chief counties	A	..	B	..	B	..	..	..	..	..	..	..	..	..	..	..	B
6. Give some account of the English settlements in Africa	B	..	C	C	B	B	C	C	C	B	B	C	..	B	..	..	B
7. What do you know of the religion, progress in civilization, and natural productions of China ?	C	C	..	..	B	B	B	B	C	A	C	B	C	C	..	..	A

ALGEBRA AND MENSURATION.—March 24, 1843.—2 to $5\frac{3}{4}$ P.M.

Figure characterizing the Pupil	21	3	2	34	5	7	4	9	22	17	8	11	6	23	10	30	1
1. Divide $a^5+5a^4x+10a^3x^2+10a^2x^3+5ax^4+x^5$ by $a^2+2ax+x^2$	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	A
2. Multiply $x^2-\frac{x}{2}+\frac{x}{3}$ by $\frac{x}{3}+2$	..	..	B	C	A	A	A	A	..	A	B	B	C	..	B	..	B
3. Solve the following equations: $x-\frac{x+3}{3}+15=\frac{12x+26}{5}$	A	A	A	C	A	A	A	A	A	B	A	A	C	C	A	A	A
$4x^2-3x=85$	B	A	A	A	A	A	A	A	A	A	B	B	A	A	A	A	A
$x=3y$ and $10x+y=x^2+12$	..	B	B	..	..	A	A	A	..	C	A	..	A	C	..	..	B
4. A certain number of sheep cost 120*l.*; 8 die, the remainder being sold at 8*s.* a-head profit, produce 120*l.* Find the number of sheep. .	..	..	A	..	..	A	A	A	..	..	A	..	A	..	..	..	A
5. Find how many terms of the series 5, 7, 9, &c. must be taken to equal 437?	..	..	A	..	..	A	..	..	..	..	C	..	A	..	..	..	A
6. Expand $(x^2+3y)^5$ by the Binomial Theorem .	B	B	A	..	C	A	C	A	..	..	C	C	A	..	B	..	A
7. Divide 24 in 2 parts, whose product shall be to the sum of their squares :.3:10::3:10 .	..	A	A	..	..	..	..	B	..	..	B	..	A	..	..	..	A

8. Find the area of a trapezoid, the parallel sides being 750 and 1225 links, and the distance between them 1540 links	A	A	..	A	A	B	A	B	A	..	..	..	A	C	..	A	A
9. ACB and ADC are right angles, AC is 108 yards, CB is 144 yards, find CD, BD, and DA. 	A	..	..	C	B	A	B	B	C	A	C	A	B	C	..	B	B
10. A ladder 30 feet long, inclining at an angle of 60° rests against a wall, find the height of its top from the ground, and the distance of its foot from the base of the wall	A	..	C	A	A	A	A	A	B	..	B	B	A	A	..	..	B
11. Find the area of a sector, where the radius is 9 feet, and the chord of the arc 6 feet	A	..	C	..	..	..	..	..	..	..	..	..	A	C	..	..	..
12 Find the acreage of a triangular field, the sides being 380, 420, and 765 yards.	B	..	C	B	..	..	C	B	B	C	C	C	A	..	..	C	..
13 Find the contents of a piece of timber, the bases being squares, each side of the greater end being 15 inches, and each side of the lesser end 6 inches; the length 24 feet	B	..	B	C	C	B	..	..	B	..	C	..	B	C	C	C	C
14. State Thomas Simpson's rule for finding the area of irregular figures, and give a practical exemplification of it in a particular case. . .	A	..	A	A	B	A	A	A	A	..	A	A	A	A	A	..	A

* Mr. Tate suggests that trigonometrical tables should have been supplied for working this question, as the pupils had not been made acquainted with the empirical rule required.

SENIOR DIVISION.

RELIGIOUS INSTRUCTION—March 27, 1843.—2 to 5½ P.M.

Figure characterizing the Pupil	40	31	3	2	5	24	12	14	32	29	7	4	36	9	17	8	39	23	28	30	1	37
1. What is meant by the doctrine of the atonement?	A	A	A	A	B	A	A	A	B	A	A	A	A	A	A	B	A	A	A	A	A	A
Give Scriptural grounds for your statements on this head	A	A	A	A	C	B	C	B	C	A	A	A	A	B	A	A	A	A	A	A	A	A
2. Show from the Bible that we are encouraged and commanded to trust to God's providence for ordering aright matters that may seem of small importance, as well as great matters	A	A	A	A	A	A	C	B	..	B	..	B	B	A	..	B	A	A	..	A	B	A
3. Show that our Lord Jesus Christ was truly, and in the highest sense, God	A	A	B	B	A	A	B	C	B	A	..	A	C	A	A	A	A	B	C	A	A	B
4. Show how the time	A	A	..	A	A	A	..	..	A	A	A	A	B	A	A	B	A	A	..	A	A	A
place	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
and manner of our Saviour's birth were limited by prophecy	A	A	..	A	A	A	A	A	A	A	A	A	A	A	A	A	A	..	A	A	A	A
5. In what respects do Isaac	A	A	B	B	A	A	B	B	B	B	A	B	B	A	B	A	A	A	B	A	A	B
Joseph	A	A	B	B	A	A	A	B	B	A	..	A	C	A	B	A	B	A	B	A	A	B
and David seem to have been types of our Lord?	A	A	B	..	A	B	..	..	..	B	..	A	C	A	C	B	A	C	..	B	A	C

6. Cite passages from the Liturgy, in which the truth is recognized, that all that is good in us comes only from God	A	C	A	B	..	..	..	B	..	A	..	..	..	..	..	B	..	..	C	B	B	C
7. Show from the precepts and examples of Scripture, the full character of that love which all of us are required to bear one towards another	A	A	B	B	B	B	A	A	..	A	..	A	..	A	B	B	A	B	..	A	A	A
8. Explain and give Scriptural grounds for the statement that at our baptism we are made members of Christ	B	A	C	C	C	B	..	..	..	A	C	A	..	A	..	A	A	A	..	A	A	B
Children of God	A	A	C	C	C	C	..	..	..	B	C	B	..	B	..	B	A	A	..	C	A	C
and heirs of Heaven	A	A	C	C	C	..	..	..	..	B	C	B	..	A	..	B	A	B	..	..	A	C
Does our Saviour teach that all those that are joined to him will remain with him for ever?	A	B	..	C	B	A	..	..	..	..	C	C	..	B	..	C	C	..	..	..	..	B
9. Give some account of the lives of Joshua . .	A	A	B	B	B	A	B	C	B	A	A	A	B	A	B	C	A	A	..	B	A	B
Samuel . .	A	A	C	B	A	A	A	B	B	A	A	A	B	A	B	B	A	B	..	B	A	A
Elijah . .	A	A	..	A	B	A	B	C	..	A	A	A	A	A	B	B	B	A	..	..	A	B
St. Paul . .	A	A	..	B	B	B	..	C	C	A	A	..	..	A	A	C	A	A	..	..	A	A
10. On what grounds do you believe in the resurrection of the body?	A	A	..	..	B	A	..	B	..	B	..	..	B	B	..	C	A	B	C	..	A	B
11. Give the meaning of the word parable as it is used in the Scriptures	A	A	B	B	A	B	..	B	..	B	..	..	..	A	B	B	B	B	C	..	A	B
12. What are the chief advantages of parabolical teaching?	B	A	B	B	A	B	..	B	..	B	..	..	..	A	A	B	B	B	B	..	A	B

SENIOR DIVISION.

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ENGLISH HISTORY AND GRAMMAR.—March 28, 1843.

Figure characterizing the Pupil*																	
1. Give some account of the dominion of the Romans in Britain, with the dates	A	A	B	A	A	A	A	A	C	B	B	B	B	B	B	A	A
2. Name the kingdoms of the Saxon Heptarchy, showing the portions of England severally belonging to them	B	B	B	..	A	A	B	B	..	..	..	..	B	B	..	..	A
3. Who was the first of the Plantagenets; give some account of his character and general policy	C	..	..	..	A	A	A	A	C	C	A	C	A	B	C	B	A
4. To what reigns would you attribute the introduction of the feudal system	A	..	C	A	A	A	A	A	A	A	A	A	..	A	..	A	A
The making Courts of Justice stationary, and open to all	..	..	C	A	A	C	C	A	A	A	B	..	..	..	..	A	..
Trial by jury	A	..	..	A	A	A	A	A	..	B	C	A	..	..	..	..	A
5. What was the constitution of the Wittenagemot	..	..	..	..	B	B	B	A	B	B	B	..	..	A	..	A	A
How early do we find appeals made to a representative Government for granting supplies	..	..	..	..	B	A	A	A	..	A	A	..	..	A	..	B	C
6. Give some account of the rise and progress of the Reformation in England to the close of Henry VIII.'s reign	C	..	..	..	A	A	B	B	..	B	B	..	..	B	..	..	B

7. From what Latin roots are the words *accent*	..	C	..	..	A	B	..	A	..	..	..	..	..	..	..	..	A
Carnage	A	B	A	A	A	A	..	A	A	A	A	..	A	..	B	..	A
Curry	..	..	..	..	B	..	..	..	..	..	..	..	..	..	..	..	B
Success derived, give other instances of words to be traced to the same roots	A	A	A	A	A	A	..	A	A	A	A	A	..	A	B	B	A
8. Parse the sentence†	A	A	B	B	A	A	A	A	A	A	A	B	A	A	A	A	A
9. Give some instances of nouns forming their plurals irregularly after the Saxon mode	B	B	B	..	B	..	B	B	B	B	C	B	A	A	C	A	A
(2) After the Latin mode	..	B	A	A	B	..	..	A	B	..	A	..	A	A	A	A	A
(3) Other anomalies	A	B	B	B	..	..	C	A	B	B	B	B	..	B	B	B	A
10. Give instances of the several modes of the formation of adjectives from nouns, where the termination is a guide to the sense	A	..	..	C	A	..	A	C	..	..	A	..	..	B	..	..	A
11. Mention the chief English conjunctions	A	B	A	A	A	A	A	A	B	A	A	..	..	A	B	B	A
12. Give instances of words spelt the same, but used in senses totally distinct, often with a change of pronunciation	B	B	C	..	A	A	..	A	A	A	..	..	..	C	..	..	A
Also of words pronounced alike, but spelt differently with their respective meanings	A	A	A	C	A	A	A	A	A	A	A	..	..	..	C	..	A

* The figures characterizing the pupils have not been inserted, from an oversight at the time the scheme was drawn up; but I believe that they come in the same order as in the other schemes of the values of the answers given by the Senior Division.

† The passage is not inserted, as it proved too long, and only a few of the words were parsed, which also gives an appearance of confusion to the answer printed in page 56.

SENIOR DIVISION.

GLOBES, HYDROSTATICS, CHEMISTRY.—March 30, 1843.

Figure characterizing the Pupil	21	3	2	34	5	7	4	9	22	1	8	11	6	23	10	30	1
1. Show that the latitude of a place equals the elevation of the pole-star above the horizon of that place	A	A	A	A	A	A	A	A	A	A	C	C	..	A	..	B	A
2. Give an account of some of the methods by which the longitude has been ascertained in a ship	B	A	C	B	A	A	A	A	A	A	C	..	B	A	A	B	A
3. What defines the Zodiac?	A	A	A	B	A	A	A	A	..	A	B	..	B	A	B	B	A
And the tropical? and	A	A	A	B	A	A	A	A	A	A	A	..	A	A	A	A	A
Polar circles on the globe respectively?	A	A	A	B	A	A	A	B	A	A	B	..	A	A	B	A	A
4. Give a list of the planets in the order of their distances from the centre of attraction	A	A	A	..	A	A	A	A	A	..	B	B	B	B	A	A	B
With (if possible) some approximate estimate of their relative sizes and distances	..	..	B	..	..	C	C	..	..	..	C	C	..	..	..	..	C
5. Mention the chief properties of fluids, distinguishing between such as are elastic and such as are commonly styled non-elastic	C	A	B	..	A	A	A	A	A	B	B	..	B	A	B	A	B

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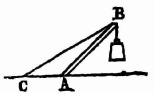
SENIOR DIVISION.

MECHANICS.—March 31, 1843.

Figure characterizing the Pupil	21	3	2	34	5	7	4	9	22	17	8	11	6	23	10	30	1
1 Show how the centre of gravity of any number of bodies in different planes may be found	C	A	A	C	A	A	C	A	B	C	C	B	B	C	A	..	A
2. A B is a bar of iron 16 feet long, weighing 2 cwt., supported by a cord B C (in length 22 feet) and a weight of 3 cwt. suspended at B: A C is 10 feet; find the tension of the cord . . . . . 	A	B	A	C	A	B	B	A	A	B	C	B	A	B	..	..	A
3. Find the weight that can be raised in 4 minutes from a depth of 90 fathoms with 3-horse power, the rope 5 inches in circumference (·046 lb. being the weight of 1 foot of rope 1 inch in circumference)	A	C	B	A	A	A	B	B	B	B	A	C	A	B	A	..	A
4. Steam, at the pressure of the atmosphere, rushes through an aperture 1 inch in diameter at the velocity of 2000 feet per second. Find the horse-power of a wheel that would apply the whole power of this jet of steam. (Volume of water in steam at the pressure of the atmosphere $= \frac{1}{1711}$th of the volume of steam)	..	..	..	..	A	A	A	A	..	..	..	..	B	C	..	..	C

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ARITHMETIC.—March 23, 1843.

Age of each pupil	Years	29	22	19	16	23	22	18	23	20	30	16	14	15	17	30	15	20	22	25	15	13	15	25	18	24
	Months	..	4	4	..	1	4	4	1	4	..	4	4	4	10	..	4	..	1	..	..	4	4	..	..	..
Standing in the Institution	Years	..	..	..	1	1	2	1	..	1	..	1	..	..	1	..	1	..	1	..	..	1	..	..	..	..
	Months	2	7	10	..	..	..	5	$4\frac{1}{4}$	7	3	3	6	8	10	$2\frac{1}{3}$	6	$3\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	4	9	$\frac{4}{5}$	$2\frac{1}{2}$	$\frac{1}{3}$
Figure characterizing the Pupil		**40**	**31**	**26**	**25**	**24**	**12**	**16**	**33**	**14**	**35**	**19**	**32**	**29**	**13**	**38**	**15**	**36**	**20**	**41**	**39**	**18**	**28**	**42**	**37**	**43**
1. Multiply 8057069 by 7005		A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
2. Divide 768478 by 125		A	A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
3. Reduce 438400 farthings to pounds		A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4. Find the value of 132 yards of linen at 2*s.* 4*d.* per yard		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
5. If sugar be 6 guineas the cwt. find the price of a lb.		A	A	A	A	A	A	..	A	A	A	B	A	A	A	A	A	A	B	A	A	A	B	A	A	A
6. If a dozen quarts of Port wine cost 2*l.* 6*s.*, how much will 138 gallons cost?		A	A	B	A	A	B•	B	A	C	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
7. Find the value of 2150 at $9\frac{3}{4}d.$		A	A	A	A	A	A	..	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
8. Reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{8}$, and $\frac{7}{8}$ to equivalent fractions, having a common denominator		A	A	A	B	A	A	B	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	..
9. Divide 17,084,597 by ·024		A	C	A	A	A	A	C	A	A	..	A	A	A	A	B	A	A	C	A	A	A	B	A	A	C
10. Express 83,229*l.* in shillings and pence		A	A	A	A	A	A	A	A	A	..	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
11. Find the interest of 205*l.* 15*s.* for 3 months at 4 per cent. per annum		A	A	A	A	A	C	..	A	A	A	A	B	A	A	B	A	A	A	A	A	A	A	A	B	C
12. Extract the square root of 106929		A	A	A	A	A	A	A	A	A	..	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A

ADDITIONAL QUESTIONS —April 3, 1843.

Figure characterizing the Pupil .	40	31	26	25	24	12	16	33	14	35	19	32	29	13	38	15	36	20	41	39	18	28	42	37	43
1. Find the interest of 723*l* 15*s*. 6*d*. for $3\frac{1}{2}$ years at $4\frac{3}{4}$ per cent. per annum.	A	A	A	B	A	B	A	A	A	B	A	B	A	C	B	A	A	A	A	A	A	A	A	A	C
2. The rent of a piece of land is 98*l*., A feeds on it 8 cows 4 months B 5 cows 7 months, C 9 cows 6 months,—find rent of each . . .	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
3. Find the sum of $\frac{21}{23} + \frac{11}{13}$ of $2\frac{2}{5} + \frac{2}{9}$ of $6\frac{2}{3}$	A	..	A	..	..	..	..	..	C	C	C	B	B	C	A	A	C	C	C	A	C	C	B	C	..
4. Find the cost of paving a yard 26 feet 9 inches by 12 feet 4 inches, at 7*s*.8*d*. per square foot	A	B	B	..	A	A	B	A	B	..	C	A	B	A	C	B	A	B	B	A	A	A	A	B	C
5 With 20lbs. of tea at 4*s*, how much of 12*s*., 10*s*, and 6*s* must be mixed to make a composition worth 8*s* per lb.	A	..	A	A	A	B	..	A	..	A	B	A	B	A	A	A	A	A	C	A	..	A	A	A	..

JUNIOR DIVISION.

GRAMMAR AND ENGLISH HISTORY.—March 24, 1843.—10 A.M. to 1 P.M.

Figure characterizing the Pupil . .	40	31	26	25	24	12	16	33	14	35	19	32	29	13	38	15	36	20	39	18	28	42	37	43
1. Define the noun, pronoun, and verb .	A	A	A	A	B	A	A	A	B	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A
2. Parse the sentence "Tell me how many parts of speech there are." . . .	A	A	A	A	A	A	B	A	A	A	A	A	A	B	B	B	A	C	A	B	B	B	A	C
3. Give instances of verbs forming their perfect tenses irregularly	A	B	A	B	A	B	..	B	A	A	B	A	B	B	B	A	A	..	A	..	B	A	A	C
4. From what Latin or Greek root does the latter part of excuse, parallel, seclude, come?	A	A	A	A	A	B	C	B	B	B	B	B	B	B	B	B	B	B	A	A	B	..	B	..
Give other English words in which the same roots occur	A	..	..	B	A	B	..	A	..	B	B	B	..	..	B	B	B	B	A	A	..	..	B	..
5. Frame a sentence containing a pronoun, adverb, preposition, and conjunction	A	A	A	A	A	A	A	A	A	A	A	..	A	A	A	A	B	A	A	A	A	A	A	..
6. Distinguish between transitive and intransitive verbs	A	B	A	A	A	A	B	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	..

7. Give the dates of the Norman conquest	A	A	A	A	A	A	A	A	..	A	A	A	A	A	A	A	A	A	A	A	A	..	A	A
the accession of King John	..	..	A	A	A	B	..	A	..	A	A	A	A	B	..	..	..	..	B	..	..	..	..	..
the death of Henry V.	..	..	B	B	..	..	..	C	..	A	B	A	..	C	..	..	..	..	..	..	..	..	..	..
and the marriage of Henry VIII. with Anna Bullen . .	..	B	B	B	B	B	..	C	..	..	B	..	B	B	..	..	..	..	..	..	..	..	..	C
8. How was Stephen connected with the Royal Family of England? . . .	A	A	B	B	A	B	..	A	B	..	..	A	B	..	..	A	C	..	A	B	A	A	C	A
9. Distinguish between the Kings of the Houses of York and Lancaster . .	A	A	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
With whom, and how did the struggle terminate?	A	A	..	..	..	..	..	..	..	..	..	..	..	C	..	..	..	..	A	..	..	..	..	..
10. In whose reigns did Thomas à Becket .	A	A	B	C	A	A	..	B	..	..	C	C	A	A	A	C	..	..	A	B	C	..	A	..
Wycliffe . . .	A	A	..	..	C	C	..	..	..	..	..	C	B	..	..	..	..	..	B	..	..	..	..	..
And Cardinal Wolsey respectively die? Give some account of these.	A	A	B	C	..	B	..	C	..	..	..	A	A	A	..	..	..	..	B	..	..	..	..	..
11. Give some account of the struggles between England and Scotland . . .	A	A	..	..	B	B	..	C	..	..	C	C	A	..	..	B	..	..	C	B	..	..	..	C

RELIGIOUS INSTRUCTION.—March 28, 1843.

Figure characterizing the Pupil .	21	26	25	34	16	33	35	19	13	38	15	22	20	41	11	6	18	10	42	43
1. Why was our Lord called Jesus? . . .	A	A	A	A	B	A	A	A	A	A	A	A	C	A	C	A	A	A	A	A
Give some account of other persons of whom we read as bearing the same name . .	C	B	C	C	..	B	A	C	C	B	B	B	..	B	B	..	B	C	B	C
Show the full significance of the name as applied to our Lord	C	B	..	C	..	B	A	C	B	..	..	B	..	..	..	B	C	..	B	B
2. What is faith?	B	A	B	A	..	A	A	A	A	A	B	A	B	A	B	A	B	B	B	B
How are we taught to distinguish a dead faith from that by which we are justified?	B	..	B	B	..	A	A	B	B	A	B	A	B	B	B	B	..	B	B	B
3. What is meant by the Kingdom of Heaven?	A	B	C	A	..	B	A	A	B	B	B	A	A	C	B	C	A	..	..	A
The names Satan? . .	..	..	..	..	..	..	C	..	..	..	..	..	C	..	..	..	..	..	..	C
And the Devil? . . .	C	..	..	..	..	..	..	C	C	C	..	..	..	..	..	..	..	..	..	C
By that statement "I will have mercy and not sacrifice"? .	..	..	..	..	..	..	..	..	C	..	..	..	..	..	..	..	C	..	..	..
4. In what respects does our observance of Sunday differ from the Jewish Sabbath?	B	..	B	A	..	A	..	B	C	B	..	A	B	..	C	B	B	B	B	B
5. What is the teaching of Scripture? . .	..	B	..	B	..	B	A	C	..	B	C	B	..	B	..	..	..	C	C	B
And of our Church on the subject of fasting?	..	..	..	..	..	B	..	..	..	..	..	..	..	..	..	..	..	..	..	B
6. Explain the terms Absolution	A	B	A	..	..	A	..	C	..	A	A	..	A	B	A	..	A	A	..	..
Advent	A	B	A	B	..	A	A	B	B	A	A	A	A	A	B	A	A	A	B	B
Catholic	A	A	A	A	..	B	A	A	A	C	A	A	..	A	A	A	B	A	..	B
Communion	C	..	C	..	..	C	A	B	..	B	C	C	C	C	A	C	..	C	..	..

Easter	B	..	..	B	..	..	B	B	..	B	..	..	..	..	..	C	C	..	..	..
Lady-day	C	..	C	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	B
Lent	A	..	..	B	..	C	..	..	B	B	..	A	..	..	..	..	..	..	..	..
Sacrament	A	..	B	B	..	B	A	C	..	B	..	..	C	A	A	B	A	..	..	B
7. In what sense are Christians the salt of the earth?	..	..	..	..	..	..	A	B	C	..	B	C	..	A	..	A	C	B	C	B
8. Give some account of the lives of Moses	A	A	B	A	..	B	B	C	B	B	B	A	B	B	C	B	B	B	B	B
Solomon	A	..	B	B	..	B	B	C	B	B	B	B	B	C	B	C	B	C	B	B
Daniel	B	..	B	B	..	..	..	C	B	B	B	A	..	C	B	B	B	C	A	B
St John	B	..	B	C	..	B	C	..	B	C	..	B	..	B	C	..	..	C	B	B
9. Give the lessons taught by the Parable of the Sower	C	B	C	C	..	B	B	C	B	..	A	A	..	..	..	..	C	B	..	B
The Leaven	C	..	..	..	..	..	..	..	C	..	B	B	..	..	..	..	..	..	..	B
The Lost Sheep	B	B	C	..	..	B	..	C	B	..	B	..	..	..	..	..	..	C	..	B
The Ten Virgins	B	B	B	B	..	B	..	C	C	..	B	B	..	..	..	A	B	B	..	B
10. How does the Catechism paraphrase the Sixth?	A	..	..	..	..	A	..	..	..	..	..	..	..	A	..	A	..	..	..	..
Eighth?	A	..	..	..	..	..	..	..	..	..	..	..	..	A	..	A	..	..	..	..
And Ninth Commandments?	A	..	..	..	..	A	..	..	..	..	..	..	..	A	..	A	..	..	..	..
11. When did our Lord severally ordain the two Sacraments?	B	A	C	B	..	C	..	..	B	..	A	A	..	..	C	..	B	..	..	A
12. Show fully the encouragement given in Scripture to men to pray to God	A	A	B	B	..	B	A	B	A	..	A	A	C	B	B	A	..	B	..	A
How and what may we ask with assurance and success?	B	B	..	B	C	B	A	B	B	..	B	A	..	B	C	B	..	B	..	B

GLOBES, MENSURATION.—March 30, 1843.—10 A. M. to 1 P. M.

Figure characterizing the Pupil .	40	31	26	25	24	12	16	33	14	35	19	32	29	13	38	15	36	20	41	39	18	28	42	37	43
1. Give arguments showing that the earth is round	A	A	A	B	A	A	..	A	A	A	A	B	A	B	B	A	A	A	A	A	A	A	A	A	C
2. What is meant by the Ecliptic? .	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	..
The latitude of a place? . .	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	..
Its longitude?	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	..
How are these latter determined? .	A	A	B	..	A	A	..	B	C	B	C	A	B	..	..	..	..	..	B	A	..	A	A	C	..
3. Give a familiar explanation of the statement, that attraction varies inversely as the squares of the distances	..	C	..	..	..	..	..	..	..	..	C	..	..	..	..	..	C	..	..	..	..	C	B	C	..
4. Explain the phenomenon of an eclipse of the moon	A	A	C	..	A	A	..	..	..	B	C	..	A	A	A	..	B	A	A	..	..	..	B	B	..
5. Is there most twilight at the Equator, or at the Poles? Give the reasons	A	A	C	C	A	A	..	..	..	..	..	..	A	B	..	..	..	B	C	..	..	A	B	C	..
6. What causes the change of seasons?	..	A	B	..	A	B	..	C	C	A	C	..	C	A	..	C	C	..	B	B	..	B	B	C	..
7. How many cubic yards in a cutting, where the heights at every 2 chains are 0. 3, 5, 7·5, 8, 9·5, 8, 6, 4, 0, the width of the line 33 feet and the slopes 2 to 1? . . .	A	A	A	A	B	A	A	B	C	B	A	A	C	A	A	B	A	A	B	A	A	A	B	A	C

8. Find the area of a room 75 feet 9 inches, by 17 feet 7 inches . .	A	A	B	A	A	A	A	A	A	..	..	A	A	A	A	B	A	A	A	A	B	A	A	A	..
9. How many square feet in a triangle, whose sides are 13, 14, and 15 feet?	A	A	A	A	A	A	A	A	A	..	A	A	A	A	A	A	..	A	..	A	A	A	..	A	..
10. Find the hypothenuse of a right-angled triangle, the sides being 10 and 14 feet	A	B	A	A	C	B	A	A	C	..	A	A	A	A	A	A	..	A	C	B	A	A	A	A	A
11. Find the area of a trapezium, the diagonal being 108 feet 6 inches; and the perpendiculars on it 56 feet 3 inches, and 60 feet 9 inches, respectively	A	A	C	B	A	A	A	A	C	..	C	A	A	..	..	C	..	A	C	A	C	A	A	A	..
12. Taking the circumference of the earth at 25,000 miles, what is its diameter?	A	A	A	A	A	A	..	B	C	..	B	A	A	A	..	B	C	A	A	A	B	A	A	A	..
13. Find the cost of roofing a house, at 11s. per square, the length within the walls being 50 feet, 9 inches; and the breadth, 30 feet: height of roof $\frac{1}{8}$ the width	B	C	..	..	C	..	..	..	..	..	..	A	B	..	..	C	..	..	A	C	..	A	A	C	..
14. Find the content of a cone, the circumference of base, 9 feet; height, $10\frac{1}{2}$ feet	A	C	A	C	A	C	..	..	..	..	B	C	B	..	..	C	..	C	C	A	B	A	A	A	..

JUNIOR DIVISION.

MECHANICS.—March 31, 1843.—10 A.M. to 1 P.M.

Figure characterizing the Pupil. . . .	40	31	26	25	24	12	16	33	14	35	19	32	29	13	38	15	36	20	41	39	18	28	42	37	43
1. Classify under the different sorts of levers the action of crowbars, doors on their hinges, extraction of a nail by a cleft hammer, handspikes, muscles of the limbs of animals, nutcrackers, oars, pincers, pokers, rearing a ladder, scissors, snuffers, steelyard, tongs, tweezers .	B	B	C	B	B	B	C	B	B	A	C	B	B	A	C	A	..	B	B	C	B	C	A	B	..
2. Given the direction and proportion of any number of forces, acting on a body, to each other; show how the direction and proportion of the resultant may be found.	..	..	..	C	..	A	C	..	C	B	A	..	B	C	B	B	..	B	B	..	B	A	A	B	..
3. Explain how wheels of large diameter lighten the labour of horses in drawing	C	..	..	..	..	..	..	..	..	..	C	..	..	..	..	..	..	C	C	..	..	..	A	..	..
4. Find the proportion of the power to the weight in the annexed system of pulleys ( )	..	..	..	..	A	A	..	..	A	..	A	..	C	C	..	A	..	A	A	..	A	A	A	A	..
5. How many cubic feet of water will an engine of 20-horse power pump in 20 hours from the bottom of a shaft of 200 fathoms? . . .	A	A	A	..	..	C	A	A	..	..	..	A	A	..	..	C	..	..	..	A	B	A	A	A	..
6. Find the units of work done by a horse in drawing a ton on a level road, 2 miles in length, the friction $\frac{1}{30}$th of the load	A	B	A	A	C	C	A	A	..	..	C	A	B	..	A	A	A	..	B	A	A	A	A	A	..
7. Find the units of work in raising a brick wall, 50 feet long, 2 feet broad, and 20 feet high, the weight 150 lbs. per cubic foot	C	C	..	C	C	..	..	..	..	..	..	C	..	C	..	..	..	..	A	C	..	A	A	C	..

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JUNIOR DIVISION.

GEOGRAPHY.*—March 29, 1843.—3 hours.

Figure characterizing the Pupil	40	31	26	25	24	12	16	33	14	35	19	32	29	13	38	15	36	20	41	39	18	28	37
1. Describe the chief physical features of Palestine .	A	A	C	A	A	A	C	B	A	A	A	B	B	B	B	B	B	A	B	A	A	A	B
2. Give some account of the present appearance and state of Jerusalem . .	C	B	C	C	B	B	..	C	C	B	B	B	B	B	C	C	B	B	C	A	C	B	C
3. Classify the rivers of Europe according to their lengths, and the seas into which they fall . . .	A	B	B	B	A	B	C	C	C	B	A	B	B	A	C	C	C	C	C	A	B	B	B
4. Describe the natural productions and physical features of Spain and Portugal	A	A	C	B	B	A	C	B	C	B	C	C	B	C	B	C	..	C	A	A	B	B	B
5. Draw a map of South America, marking the course of the chief rivers. . .	B	B	..	C	B	B	..	C	..	..	B	C	B	A	..	B	..	B	C	C	A	B	C
6. What is known of the interior of Africa? Is any commerce carried on with it?	C	C	C	C	B	C	..	C	C	..	C	..	B	C	C	A	..	C	B	C	C	C	C
7. Give a sketch of the chief facts connected with the physical geography of the world	B	A	C	B	B	B	..	B	C	..	A	B	A	A	B	B	..	C	B	B	C	..	B

* I have reason to believe that, through want of communication with Mr. Hughes, my questions did not exactly apply to the subjects on which he had been recently lecturing.

These Tables have been formed with all the care that was in my power. The results which I obtained were checked by the subsequent examination of the written answers by the teachers at Battersea. If in any respect these results fail of conveying just impressions as to the attainments of the pupils, it will be on the side of barely assigning to them due merit. In the questions involving calculation, I have attached great importance to exact accuracy; the discovery of the most trivial error, caused by haste or inadvertence, has been strictly noted. In the hurry of an examination a question has been sometimes misapprehended, but if some part of the answer did not fairly come within reach of the question set, no credit has been allowed for it in the Report. In some of the mechanical and mathematical papers, the logical skill, and precision of arrangement of the answers given can only be fairly judged of by the inspection of the original manuscripts.

I have printed in the Appendix specimens of the answers to all the more important papers, as these were sent in by the pupils, allowing only of such technical corrections in punctuation and spelling, if needed, as the printer's compositor might make during the passage of the manuscripts through the press. It must further be borne in mind that the object of the institution is to impart a great movement to the moral and intellectual being of the pupils; that consequently they will have in some measure apprehended many things which they are not able to produce on paper at an examination, but which, remaining in the mind, will furnish associations that will facilitate their future acquirements; the lectures being about them in some sense as the light of heaven, giving them glimpses of many things hereafter to be made their own, quickening their desires after knowledge, as well as affording help and guidance as to the directions in which the search after it should be made.

There are one or two matters noticed in the printed Report on which it is right to add a few words:—

It had been intended to give a regular course of teaching in English literature, but since the establishment has been set on foot, the number of young men in the training-school has gradually increased; and it has been already noticed that the Directors have been led by external circumstances to diminish the course of training originally intended, and that they apprehend that the funds at their disposal, and the views of the patrons of the pupils, will compel them to limit this course to one year. Under these circumstances, a course of more liberal instruction on English literature and elocution has been abandoned, and the instruction given on these subjects is now only incidental and occasional.

At first, a drill-master attended the training-school on three afternoons in every week, for one hour, to drill the students, and to teach them gymnastic exercises, both with and without the aid of the gymnastic frame and bars; but this course of instruction has been interrupted since the early part of the spring, because

it was felt desirable that the person to whom this instruction was confided should be resident, in order that the discipline might be uniform in every part of the establishment. The superintendent of labour will in future be master of this department; but as he has hitherto been attending classes in the training school for his own improvement, he has not as yet had charge of the drill. This instruction will soon be intrusted to him.

Household Management.

The arrangement for the household work and daily routine will be best understood by an actual transcript of the regulations in force for the present month, the pupils being severally characterized by the same figures as designate them throughout the examinations:—

Distribution of Household Work for the Month ending August 28, 1843.

Sweep and dust bed-rooms	No. 26.
Sweep upper and lower stairs and passage	No. 9
Sweep upper class room	No. 32.
Sweep lower class room	No. 17.
Sweep dining-hall and attend to stove	No. 11.
Sweep cellar-stairs, cellar, and passage	Nos. 4 and 35.
Attend to dining-hall and class-room lamps	No. 44.
Attend to tool-shed	No. 34.
Attend to upper class-room stair, passage, and wash-house lamps	No. 45.
Clean large wash-house, and attend to towels, soap, boxes, shoes, &c.	No. 39.
Pump-water	No. 42. and 33.
Sweep back yard, out-buildings, and sift cinders	No. 41.
Clean small wash-house	No. 26
Clean knives and forks	Nos. 3, 5, and 29.
Clean windows of class-rooms, hall, and wash-house; open and close shutters	Nos. 34 and 19.
Attend to brooms, brushes, and see the windows and doors secure at night	No. 38.
Clean and prepare vegetables for use	Nos. 15, 16, and 42.
Clean bedroom and stair windows	Nos. 10 and 28.
Sweep and dust the master's rooms	No. 10.
Ring the bell, and attend to the gate-bell before 7 A.M, and after 9 P.M.	No. 18.
Feed and milk cows	Nos. 13, 27, 37.
Feed pigs and attend to drill ground	No. 16.
Attend to gymnastic apparatus	No. 37.
Churn milk on Mondays and Thursdays	No. 18.
Collect wood for fires	No. 7.
Carrier of letters	No. 38.
Receive orders for garden-work	Nos. 26 and 41.
Superintendent of bedrooms, clothes, &c.	No. 35.
,, household work	No. 40.
,, garden work	No. 22.
Stewards	Nos. 4 and 36.
General Superintendents	Nos. 38 and 40.

DAILY ROUTINE (in force November, 1842).

½ past 5		Rise, Wash Dress, and make Beds					
½ to 6		Household Work, viz Sweeping Floors, Cleaning Grates, Shoes, Knives, &c.					
½ to 7	1st Class	Religious Instruction by Mr Hunter (daily)					
	2nd Class	Music (Tilleard)					
½ to 8		Reading of Scripture and Prayers.					
½ past 8		BREAKFAST					
½ to 9		Teachers from First Class go to the Village School					
		Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
9 to 10	Both Classes	Religious Instruction, by Hon and Rev R Eden	Garden work	Garden work	Garden work	Garden work	Garden work
10 to 11	Ditto	Garden work	Ditto	Ditto	Ditto	Ditto	Examination
11 to 12	1st Class	Globes	Reading and Parsing	Miscellaneous Calculations	Reading and Etymology	Notes on Mechanics, Natural Philosophy, and Algebra	Ditto
	2nd Class	Reading and Parsing	Mensuration	Arithmetic (H)	Arithmetic (T)	Arithmetic (H)	Ditto.
12		First Class Students return from Village School.					
12 to 1	1st Class	Music	Music (Tilleard)	Algebra	Music	Music (at Church)	Examination
	2nd Class	Religious Instruction by Mr Hunter (daily).					Ditto
1		DINNER					
½ to 2		Teachers from Second Class go to the Village School					
2 to 3	1st Class	Garden work	Garden work	Garden work	Garden work	Garden work	Geography
	2nd Class	Ditto	Ditto	Ditto	Ditto	Ditto	Household work
3 to 4	1st Class	Mechanics	Algebra and Principles of Arithmetic	Arithmetic	Mechanics	Algebra and Principles of Arithmetic	Ditto
	2nd Class	Reading and Parsing	Reading and Etymology	Mechanics	Reading and Parsing	Reading and Etymology	Geography
4		Second Class Students return from Village School					
4 to 5	1st Class	Preparation for V S & Themes	Preparation for V S & Notes	Preparation for V S & Notes	Preparation for V S & Themes	Preparation for V S & Notes	
	2nd Class	Globes	Geography	Grammar and Etymology	Geography	Mechanics	
5 to 6	1st Class	Natural Philosophy	Ditto	Chemistry	Ditto	Mensuration	
	2nd Class	Arithmetic	Preparation for V S & Notes		Pestalozzi	Grammar and Etymology	
½ past 6		SUPPER					
7 to 8	1st Class	Chemistry	Arithmetic	Pestalozzi	Grammar and Etymology	Mulhauser Writing	
	2nd Class	Preparation for V S & Themes	Mechanics	Preparation for V S & Themes			
8 to 9	1st Class	History of England	Sullivan's Geography	History of England	Reading and Parsing	Grammar and Etymology	
	2nd Class				Preparation for V S & Notes	Preparation for V S & Notes	
9		Reading of Scriptures and Prayers.					
½ past 9		Retire to Rest					

SUNDAY

Religious Instruction from 7 to ½ past 8 (Evening) to both Classes, by Mr Hunter]

The state of the village school is fully described in the special report annexed, the information being disposed according to the scheme of questions furnished to me by your Lordships. The quickness of apprehension, and extent of knowledge shown by the lower classes are very noticeable. The upper classes seemed to me chiefly remarkable for their knowledge of geography and their arithmetical skill, but their religious knowledge and their attainments in all respects are in my judgment beyond those of the boys in attendance at any similar school which I have inspected. Mr. Macleod is an accomplished teacher, among the very first for his skill in the government of a class, and knowledge of methods of teaching. It is most interesting to watch the tact with which the attention of his pupils is secured, and to observe how, with his own stores of knowledge clearly in his view, he will while engaged in testing the acquirements of his classes by rapid questioning, convey continually to them fresh information. The school has also the advantage of the constant superintendence of the parochial clergy.

At the period of my examination there were present 103 boys, divided into five nearly equal classes. The average attendance is 112 out of a number on the books of 120. They are classed chiefly according to their skill in reading, a fresh classification being used for the purpose of teaching arithmetic. All are taught arithmetic (according to the Pestalozzian method), and all, except the lowest class, are exercised in writing on copy-books, in geography, etymology, and vocal music from Mr. Hullah's tables. Grammar and the History of England are taught to the three upper classes, and the first class practises drawing from models according to the method so successfully communicated to the English public by Mr. ButlerWilliams.

The room is fitted with desks and benches, according to the recommendations of your Lordships, and is well furnished with black-boards, maps, and every needful requisite for intellectual training.

While speaking of these schools, the Hon. and Rev. Robert Eden, the vicar of the parish, supplied me with the following statistical facts, the truth intimated in which is of very wide application. In the parish of Battersea during the last year was paid—

	£.	*s.*	*d.*
Police Rate	837	10	0
County Rate	558	6	8
Total . . .	£1395	16	8

Of this sum at least £1100 is spent for the prevention, detection, and punishment of crime. Whilst the annual subscriptions to all the schools in the parish, whether in connexion with the church or otherwise, do not amount to £350.

The number of hours per week given in the Training School to the several subjects is as follows :—

		Per Week.
Religious Instruction, besides the reading of the Holy Scriptures and Prayers morning and evening, and instruction on Sundy evening.	1st Class	6 hours
	2nd Class	6 ditto
Geography	1st Class	3 ditto
	2nd Class	3 ditto
Reading, Etymology, and Grammar	1st Class	5 ditto
	2nd Class	8 ditto
English Composition	1st Class	2 ditto
	2nd Class	2 ditto
English History	1st Class	2 ditto
	2nd Class	2 ditto
Arithmetic	1st Class	2 ditto
	2nd Class	2 ditto
Pure Mathematics and Mensuration	1st Class	4 ditto
	2nd Class	2 ditto
Mechanics and Natural Philosophy	1st Class	6 ditto
	2nd Class	5 ditto
Pestalozzi	1st Class	1 ditto
	2nd Class	2 ditto
Acting as Teachers in Village School	1st Class	15 ditto
	2nd Class	15 ditto
Preparation for Village School	1st Class	5 ditto
	2nd Class	5 ditto
Garden work	1st Class	16 ditto
	2nd Class	16 ditto
Music	1st Class	6 ditto
	2nd Class	6 ditto

The students are under the direct instruction of teachers during one hour and a-half ot Sunday, four hours of Saturday, and eight hours of the other days in the week. They are at garden work during three hours a-day, under the superintendence of one of the elder students, who has a thorough knowledge of gardening, and is, in other respects, suitable for such a charge.

In the various departments of household work, to which a morning hour of every week-day is devoted, the pupils are in some degree left to themselves; but as there are students of approved character appointed as superintendents of these departments, and each person's work and time for such work are distinctly specified by a monthly routine, there is security afforded for its due performance, or the detection of its neglect.

While the teachers are engaged in the preparation of lessons for the village school, the other students of their class are occupied in extending or transcribing their notes taken during lectures; and on such occasions a teacher or student superintends.

While it is thus considered necessary that the conduct of students, for whom the institution has to vouch, should be as much as possible under observation, there is encouraged between them and their teachers such a degree of frank and easy intercourse,

as on the one hand consists with the firmness necessary to support the teacher's authority; and on the other hand, may give scope for the development of an unequivocal moral aspect in the pupils.

Through the kindness of the Directors of the Training Establishment, I have been furnished with the following plan for future arrangements:—

"That the students entering the establishment consist of four classes:—

1. "Those who provide the whole cost of their maintenance and education themselves, or by their patrons. These students will be free to settle where they please, at the close of their course of training.

2. "Those who provide 30*l.* towards the cost of their maintenance and education, and who sign an agreement to serve under the appointment of the Directors from the period when they pass the examination for the first year's certificate.

3. "Those who provide 30*l.* towards the cost of their maintenance, and give security for the payment of 25*l.* within one year of the period when they leave the institution. These students will be free to settle where they please.

4. "The trustees will offer every quarter an exhibition of 25*l.* to the best candidate for admission, who may be able to pass a preliminary examination in religious knowledge, English grammar, etymology, and composition; arithmetic, as far as decimals, and the geography of Palestine and England. The examinations (to be conducted by the masters) will be partly on paper, partly by oral questions. The successful candidates will be admitted to one year's training for 30*l.* without any condition as to future service.

5. "The trustees will offer for competition an exhibition of 25*l.* value every quarter to the ten students, whose year of training expires in that quarter. This exhibition will be awarded after trials by examination papers, oral questioning, and public teaching in the village school to the student whose proficiency in his studies, skill in teaching, and character, shall appear to the Directors and masters to warrant the greatest amount of confidence in his success as the master of an elementary school."

With regard to the finances of the institution, it may be sufficient to state, shortly, that by the close of the present autumn upwards of 6000*l.* will have been expended on the institution beyond the receipts for the maintenance of pupils. Of this sum, Mr. Kay Shuttleworth and Mr. Tufnell have contributed 2,500*l.* from their private resources; 1,500*l.* has been received from their personal friends; and 1000*l.* has been apportioned to them by your Lordships from the public grant. With such scanty means it is not to be wondered at that the material arrangements should have in some degree been cramped; but there is a plan in contemplation for the enlargement of these, one feature of which is to allow to each pupil a separate bed-room, an arrangement which

the Directors feel to be especially desirable, since the institution has become a training-school for older pupils than those originally intended to be lodged within its walls.

With regard to this establishment, it must be noticed with especial gratification, that amongst those who are most distinguished for intellectual attainments, and who bear rank also with the very first for moral qualifications, are the majority of those pupils who have been selected by Mr. Kay Shuttleworth and Mr. Tufnell from the establishments for training pauper children, and who are now raised into a sphere of action where there is every reason to hope that, under the Divine blessing, they will be numbered among the most useful members of society. When it is taken into account that these started into life not simply from the lowest grade of society, but also under the measureless disadvantage of never having known a parent's care, one cannot but feel that the being permitted to accomplish even one such result is far more than an adequate return for all that has been laid out. It must further be borne in mind, that while it is of the essence of that which is really good, to work as leaven in the world, gradually, silently, yet effectually changing the nature of what is round it into the likeness of itself, it will especially prove the happy lot of these, if they are enabled hereafter to realize in their daily life the principles with which they have been imbued, to become (if I may change the allusion) the centres of healthful energy amongst large masses of their fellow men, shooting out their quickening vigour into far distant generations.

One cannot help feeling, also, a peculiar interest in the progress and success of this institution, regarding it as established by two individuals, not of large means, but whose chief strength lay in their strong perceptions of, and sympathy with the degraded and suffering condition of millions among their fellow-citizens, and in their determination under Providence to contribute somewhat towards the achievement of a radical cure. When one reflects upon other purposes, for which money is too often lavished by those to whom a large amount has been entrusted, and whose responsibility is proportionably increased, how much is it to be wished, for their own sakes, as well as for that of others, that the question could be seriously put to them, whether there be not in the outlay necessary for the attainment of such an end as has been described in this Report, materials for the exercise of the noblest ambition, as well as sources of happiness, the extent of which can never be measured within the present course of our being.

My Lords, I have the honour to be,
With much respect,
Your Lordships' most obedient and faithful servant,

(Signed) JOHN ALLEN.

To the Right Honourable the Lords of the Committee of Council on Education.

Appendix I.

List of Teachers that have been Trained at the Battersea Training School, with their present Localities.

Name of Schoolmaster.	School.	Patron.
Mr. William Bragg	Sheriffhales	The Duke of Sutherland.
Mr. Bilby	Ketley	
Mr. John Diggens	Tittensor (Trentham)	
Mr. William Diggens	Lilleshall	
Mr. Alfred Diggens	Capesthorne	Edward D. Davenport, Esq.
Mr. Sims	Marton	
Mr. George Kent	Stanmer	The Earl of Chichester.
Mr. Christie	Milton Abbott	The Duke of Bedford.
Mr. Bryan	Motcomb	The Earl of Grosvenor.
Mr. Forss	Coleshill	The Earl of Radnor.
Mr. Mitchell	Penryn	Sir Charles Lemon, Bart, M.P.
Mr. Rand	Calne	Rev. J. Guthrie, M.A.
Mr. Packett		
Mr. Wyver	Stowerton	Sir George Philips, Bart.
Mr. Pringle	Holland Farm	The Hon. Caroline Fox.
Mr. George	Newbold Verdun and Ealing Grove.	The Lady Noel Byron.
Mr. Robert Blakeston	Partially trained and likely to return to the school.	
Mr. Ephraim Brown		
Mr. Alcock	Bury	Edmund Grundy, Esq.
Mr. Sawyer	Partially trained	Rev. J. Wilkinson.
Mr. Smith	Read	Richard Fort, Esq.
Mr. Harry Wood *		
Mr. Brand	Kingswood	T. S. Alcock, Esq.
Mr. Richard Green	Tacolneston	Sir John Boileau, Bart.
Mr. Edward Lovey	Ilyde	The Rev. H. James Legge.
Mr. Daniel Broughton	Broughton	Rev. G. Frost.
Mr. Henry Carvill	Dulwich Village School	John Allen Esq., late Master of Dulwich College.
Mr. William Hammond	Swindon	Directors of Great Western Railway.
Mr. William Evans	Old Swinford Hospital	The Hon. —— Foley.
Mr. Rice	Milford	Anthony and Edw. Strutt, Esqrs.
Mr. and Mrs. Wilkinson	Walkden Moor (very recently)	Lord Francis Egerton.
Mr. John Goodall *	Gawthorpe	J. P. Kay Shuttleworth, Esq.
Mr. Tilleard		
Mr. Ferdinand Inglott	Malta	The Maltese Government.
Mr. Marshall D'Avray	Mauritius	The Governor.
Mr. Alcorn	Parkhurst Prison	The Visitors.
Mr. Wilkins		
Mr. Farncomb	Norwood School of Industry	The Poor Law Commissioners.
Mr. William Rush	Norwood School of Industry	The Poor Law Commissioners.
Mr. Henry Pope †	Norwood School of Industry	The Poor Law Commissioners.
Mr. Thomas Brown	Partially trained at Battersea, and the rest at Norwood—Bowood	The Marchioness of Lansdowne.
Mr. William Ockenden	Kingston Union Workhouse	The Board of Guardians.
Mr. Charles Castle	Parochial School, Chelsea	The Rev. Thomas Ball.

The following Pupils will soon leave the Establishment, and probably receive Appointments to the under-mentioned Schools :—

Name of Schoolmaster.	School.	Patron.
Mr. George Broughton	Oakenshaw	Richard Fort, Esq.
Mr. William Hacking	Ditto	Ditto.
Mr. Braid	Swindon	The Directors of the Great Western Railway.
Mr. William Joyner	Calne	The Rev. J. Guthrie.
Mr. James Longson	Capesthorne	Edward D. Davenport, Esq.
Mr. John Linn	Battersea, as Superintendent of Labour.	The Trustees.

Other pupils now in the establishment will leave at Christmas, but their destination is not yet settled; and a few who have been partially trained for public schools and private establishments have not been enumerated.

* Since removed. † Now at the Parochial School of Christ Church, Chelsea.

Appendix II.

Senior Division.

Specimens of Answers to Questions set in Pure Mathematics.

November 24, 1842.

Answer to Q. 1. "Find the value of 137 at 1*l.* 7*s.* 6¼*d.*" As given by No. **2**.

						£.	*s.*	*d.*	
5*s.*=¼	137								
	1								
2*s.* 6*d.*=½	137			=value of 137 articles, at		1	0	0	each.
¼*d.*=$\frac{1}{120}$	34	5		=	,, ,,	0	5	0	,,
	17	2	6	=	,, ,,	0	2	6	,,
		2	10¼	=	,, ,,	0	0	0¼	,,
	£188	10	4¼			£1	7	6¼	

Ans. 188*l.* 10*s.* 4¼*d.*

Answer to Q. 2 (first part). "Find the interest of 547*l.* 15*s.* for three years, at five per cent." As given by No. **4**.

547*l.* 15*s.* at 5 per cent. for 3 years, will be the same as 547*l.* 15*s.* for 1 year, at 15 per cent.

£.	*s.*
547	15
	15
82′16	5
	20
3′25	
	12
3′00	

Ans. 82*l.* 3*s.* 3*d.*

Answer to Q. 2 (second part). "And find the present value of 150*l.*, due in three months, at five per cent." As given by No. **5**.

The present value of 150*l.*, due three months hence, at five per cent.

£.	*s.*	£.	£.
101	5 :	100	: : 150
20			20
2025			3000
			100

	£.	*s.*	*d.*
2025)300,000(148	2	11½	
2025			
·9750			
8100			

16500
16200
—
300
20
—
6000
4050
—
1950
12
—
23400
22275
—
1125
4
—
4500
4050
—
450
—
$\frac{450}{2025} = \frac{2}{9}$

Ans. 148*l.* 2*s.* 11½ ⅔*d.*

Answer to Q. 3 (first part) "Extract the square root of 47585·059."
As given by No. 9.

To find the square root of a number, we put that number down, and the whole numbers off in twos from right to left, and the decimal from left to right.

)4,75,85·05,90(218 139 *Ans.*
4
—
41)75
41
—
428)3485
3424
—
436·1)61 05
4361
—
43623)174490
130869
—
436269)4362100
3926421
—
435679 &c.
—

Answer to Q. 3 (second part). "And the cube root of 9938375." As given by No. 6.

$$
\begin{array}{rl}
 & 9938375(215 \\
 & 8 \\
\hline
2^2 \times 300 = 1200) & 1938 \\
\hline
 & 1200 \\
2 \times 30 \times 1^2 = & 60 \\
1^2 = & 1 \\
\hline
 & 1261 \\
\hline
21^2 \times 300 = 132300) & 677375 \\
\hline
 & 660500 \\
21 \times 30 \times 5^2 = & 16750 \\
4^3 = & 125 \\
\hline
 & 677375 \\
\hline
\end{array}
$$

Answer to Q. 4. "Express 19*s.* 5½*d.* as the decimal of a pound." As given by No. 5.

$$
\begin{array}{l}
4)2 \\
\hline
12)5\cdot5 \\
\hline
20)19\cdot4583\cdot \\
\hline
\quad\cdot972916\cdot \\
\hline
\end{array}
$$

Ans. ·972916· of a pound.

Answer to Q. 5. "If 8 men build 24 square yards of walling in 6 days, how many will build 18 square yards in 3 days?" As given by No. 3.

Square Yards. Men.

24 : 18 : : 8

3 : 6

3 2 2

$$\frac{\not{2}\not{4} \times 8 \times \not{6}}{\not{4} \times \not{3}} = \underline{12 \text{ men.}}$$

$\not{4}$

Answer to Q. 6 (first part). "Divide $12x^5 - 13x^4 - 34x^3 + 35x^2$ by $4x^2 - 7x$." As given by No. 9.

$$
\begin{array}{l}
4x^2 - 7x)12x^5 - 13x^4 - 34x^3 + 35x^2(3x^3 + 2x^2 - 5x \ \textit{Ans.} \\
\quad 12x^5 - 21x^4 \\
\hline
\qquad 8x^4 - 34x^3 \\
\qquad 8x^4 - 14x^3 \\
\hline
\qquad\quad -20x^3 + 35x^2 \\
\qquad\quad -20x^3 + 35x^2 \\
\hline\hline
\end{array}
$$

Answer to Q. 6 (second part). "Divide $\frac{x^3}{3}+\frac{11x^2}{6}-\frac{7x}{9}+\frac{4}{3}$ by $\frac{x}{3}+2$." As given by No. **2**.

$$\frac{x}{3}+2\Big)\frac{x^3}{6}+\frac{11x^2}{6}-\frac{7x}{9}+\frac{4}{3}\Big(\frac{x^2}{2}+\frac{5}{4}x^2-\frac{52}{3}$$

$$\frac{x^3}{6}+x^2$$

$$+\frac{5x^2}{6}-\frac{7x}{9}$$

$$+\frac{5x^2}{6}+5x^2$$

$$-\frac{52x}{9}+\frac{4}{3}$$

$$-\frac{52x}{9}-\frac{104}{3}$$

$$+\frac{108}{3}$$

Ans. $=\frac{x^2}{2}+\frac{5}{2}x-\frac{52}{3}+\frac{36}{\frac{x}{3}+2}$ for a remainder.

Answer to Q. 7. "Expand $(a+x)^7$." As given by No. **5**.

$$(a+x)^7=a^7+7a^6x+21a^5x^2+35a^4x^3+35a^3x^4+21a^2x^5+7ax^6+x^7$$

Answer to Q. 8 (first part). "Solve the following equation: $5x^2+4x=273$." As given by No. **3**.

$$5x^2+4x=273$$

$$x^2+\frac{4x}{5}=\frac{273}{5}$$

$$x^2+\frac{4x}{5}+\frac{4}{25}=\frac{273}{5}+\frac{4}{25}=\frac{1369}{25}$$

$$x+\frac{2}{5}=\pm\sqrt{\frac{1369}{25}}=\pm\frac{37}{5}$$

$$x=+\frac{37}{5}-\frac{2}{5}=\frac{35}{5}=7$$

$$\text{Or } x=-\frac{37}{5}-\frac{2}{5}=-\frac{39}{5}=-7\frac{4}{5}$$

$$\therefore x=7$$

Answer to Q. 8 (second part). "Solve the following equation: $xy=1+2y^2$ and $x^2+xy=12$." As given by No. **6**.

$$\left.\begin{aligned}x^2+xy&=12\\xy&=1+2y^2\end{aligned}\right\}$$

Assume $x=vy$

$$\left.\begin{aligned} v^2y^2+vy^2&=12\\ vy^2-2y^2&=1\end{aligned}\right\}$$

$$\left.\begin{aligned} y^2(v^2+v)&=12\\ y^2(v-2)&=1\end{aligned}\right\}\begin{aligned}\therefore y^2&=\frac{12}{v^2+v}\\ \therefore y^2&=\frac{1}{v-2}\end{aligned}$$

$$\frac{12}{v^2+v}=\frac{1}{v-2}\therefore 12v-24=v^2+v$$

$$v^2-11v=-24$$

$$v^2-11v+\frac{121}{4}=\frac{121}{4}-24=\frac{25}{4}$$

$$v-\frac{11}{2}=\pm\frac{5}{2}$$

$$v=\pm\frac{5}{2}+\frac{11}{2}=\frac{16}{2}=8 \text{ or } 3$$

$$y^2=\frac{12}{9+3}=1$$

$$y=1$$

$$y-2y^2=1$$

$$\therefore x=3$$

Answer to Q. 10 (first part). "Find the sum of 10 terms of the series 3, 6, 9, &c." As given by No. 7.

$s=3+6+9+\ldots.n3$

$s=\overline{n-3}+\overline{n-1}.3+\overline{n-2}.3+\ldots.3$, by reversing the order of the series.

Adding these two sets together we have—

$2s=\{n+1\}.3+\{n+1\}.3+\{n+1\}.3+\ldots.$ to n terms

$2s=(\{n+1\}.3)\times n$

$\therefore s=\frac{\{n+1.3\}n}{2}$; which is the sum of the series to n (an unknown number) of terms

Then putting 10 in the place of n,

$$s=\frac{\{\overline{10+1}\cdot 3\}10}{2}=\frac{33\times 10}{2}=\frac{330}{2}=165 \textit{ Ans.}$$

Or, it may be done in the following manner:

$$s=3+6+9+\ldots\ldots 10\times 3$$

$$s=30+27+24+\ldots\ldots 3$$

$$2s=33+33+33+\ldots\ldots 33$$

$$2s=33\times 10=330$$

$$s=\frac{330}{2}=165 \textit{ Ans.}$$

Answer to Q. 10 (second part). "Also find the vulgar fraction corresponding to the recurring decimal ·123123, &c." As given by No. 8.

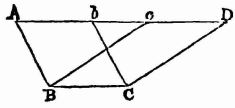
$$s=\frac{\cdot 123}{1000}+\frac{\cdot 123}{1000000}+\frac{\cdot 123}{1000000000}$$

$$1000s = \cdot 123 + \frac{\cdot 123}{1000} + \frac{\cdot 123}{10000000}$$

$$999s = \cdot 123$$

$$s = \frac{\cdot 123}{999} = \frac{\cdot 41}{333}$$

Answer to Q. 11. "Show that parallelograms on the same base and between the same parallels are equal." As given by No. **2**.



It is required to prove that the parallelograms A B C *b* and *c* B C D are equal. B C = A *b* being opposite sides of the same parallelogram, B C = *c* D for the same reason. ∴ A *b* = D *c*. To these two equals add the common part *b c*, then in the one case we shall have A *c*, and in the other *b* D; these two will ∴ be =. Now we have two triangles equal to one another; *b* D in the one = A *c* in the other; *b* C of the one = A B of the other, and D C of the one = *c* B of the other each respectively: ∴ these triangles are equal. Then from the whole figure A B C D subtract the triangle A B C, we shall have *c* B C D. Again, from the whole figure subtract the triangle *b* C D, we have A *b* C D. Equals subtracted from equals, the remainders are equal; ∴ the parallelograms A *b* C B and *c* B C D are equal to one another.

Answer to Q. 12. "Find the radius of a circle where 6 inches is the length of the versed sine of the arc whose cord is 1 yard." As given by No. **4**.

Let x = radius
D = centre of circle
Then $x - 6 = K D$
But $K D^2 + K B^2 = D B^2$
$(x-6)^2 + 18^2 = D B^2$
But $D B = x$
$\therefore (x-6)^2 + 18^2 = x^2$
$x^2 - 12x + 36 + 18^2 = x^2$
$12x = 36 + 324$
$12x = 360$
$x = 30$ inches $= 2\frac{1}{2}$ feet.

Answer to Q. 13. "Show that sin (A + B) = sin A. cos B + cos A. sin B." As given by No. **1**.

Draw C H and H D, making any angle A, and P H, making any angle B. Make P C at right angles to H C and P O perpendicular to H D. Draw K C from C parallel to O D.

△ P K C is similar to C H D. For ∠ C D H in the △ H C D is a right angle, it is equal to the right angle P K C in the triangle P C K. Again, if from the two right angles P C H and D C K we take the common angle K C H, the remaining angles P C K and H C D will be equal. Now we have the angles P C K and C K P in the △ P K C respectively equal to the angles H C D and C D H in the △ H C D. Consequently the remaining angles of the triangles are also equal. ∴ these △'s are similar.

$$\text{Sin } (A+B) = \frac{P O}{H P} = \frac{P K + K O}{H P} = \frac{P K}{H P} + \frac{K O}{H P}$$

$$\text{But}\frac{PK}{HP}+\frac{KO}{HP}=\frac{PC}{HP}\times\frac{PK}{PC}+\frac{CH}{HP}\times\frac{KO}{CH}=CD$$

$$\text{But }\frac{PC}{HP}=\sin B$$

$$\frac{PK}{PC}=\frac{HD}{HC}=\cos A$$

$$\frac{CH}{HP}=\cos B$$

$$\frac{CD}{CH}=\sin$$

$$\therefore \sin(A+B)=\sin A\times\cos B+\sin B\times\cos A.$$

Which was required, to be proved.

Answer to Q. 14. A man distant 70 feet from the foot of a tower observes it to subtend an angle of 60°, his eye being on a level with the ground, find the height of the tower. As given by No. 6.

$\angle$ O B C and $\angle$ O C B are equal, but the angles of a triangle form 180° $\therefore$ $\angle$ O being 60, the $\angle$ O B C + $\angle$ O C B = 120, and consequently each 60°. Now if O B the radius be taken as unity, O G will be $\frac{1}{2}$ being bisected by O G, and from 47th we have $\sqrt{\left(1^2-\frac{1^2}{2}\right)}=O S$ or

$\sin 60°=\sqrt{\frac{3}{4}}=\cdot 86625$

$$\text{Sin } 60° : C B :: \sin 30° : A B.\therefore$$

$$\text{Sin } 60°\times A B=\sin 30°\times C B$$

$\therefore$ C B $=\frac{\sin 60°\times 70}{\sin 30°}=\frac{\cdot 86625\times 70}{\cdot 5}=1\cdot 7325\times 70=121\cdot 2750$ height of tower.

Answer to Q. 16. "What are the chief properties of the parabola?" As given by No. 6.

One property in the parabola is, that all lines drawn from the directrix meeting the curve, and from thence to the focus, are equal. If a body be projected into the air, the course it will pursue is a parabola; if water issue from an orifice, it will describe a parabola.

Answer to Q. 17. "How may an ellipse be described practically?" As given by No. 1.

An ellipse may be described practically by taking any cord C A O and placing the ends C and O on any two points, so that the string be not stretched tight. Then by holding the line at the point A, and describing the curve D A B F, we shall have an ellipse formed, of which C and O are the foci. This curve occurs in nature, viz., the earth's path round the sun is an ellipse, of which the sun is in the focus.

Answer to Q. 18. "Find the area of a field of four sides, two of its sides being parallel, the lengths of these respectively 230 and 480 yards, and their distance 800 yards." As given by No. 4.

B C = 23 chains

A K = 48 chains

$\therefore$ D K = 25 chains

$$B\,A = 80 \text{ chains}$$
$$A\,B \times A\,D = \text{area } A\,B\,C\,D$$
$$80 \times 23 = 1840 \text{ square chains}$$
$$D\,K \times \frac{C\,D}{2} = \text{area } C\,D\,K$$
$$25 \times \frac{80}{2} = 900 \text{ square chains.}$$
$$\frac{1840+900}{10} = \frac{2740}{10} = 274 = \text{area in acres.}$$

Ans. 274 acres.

SENIOR DIVISION.

Specimens of Answers to Questions in Religious Instruction.

November 25, 1842.

Q. 3. "Show that we cannot expect forgiveness unless we forgive others." As answered by No. 1.

In the Lord's prayer, we are taught by its Divine author to beseech God to forgive us our trespasses, as we forgive those who trespass against us: and our Lord, after teaching his disciples to pray thus, makes the following comment:—"For if ye forgive not men their trespasses, neither will your heavenly Father forgive you."

Again, in the parable of the Unmerciful Servant, our Lord shows the indignation which God will evince against those who expect pardon from him; and, notwithstanding, punish, as far as possible, those who offend them in any way.

Q. 11. "Give some of the chief names and titles ascribed to our blessed Lord in the Scriptures, and show their significancy and fitness." As answered by No. 7.

In the 49th chapter of Genesis Christ is named "Shiloh," meaning "One sent," he being sent to die on the cross for our sins.

"Behold the Lamb," &c. "He was led as a lamb to the slaughter." He was as innocent as a lamb. As the lamb that was offered by the Jews, he was without spot, and without blemish.

He is respectively denominated "Prophet," "Priest," and "King." As a prophet he foretold future events, and taught mankind the way to everlasting life; as a priest, "he offered himself without spot to God," and ascended up into heaven to make intercession for us; and as a king he governs and protects his church.

In the 9th chapter of Isaiah he is called "Wonderful, Counsellor, Everlasting Father," and "Prince of Peace." As our counsellor he directs us how to obtain everlasting life; "from everlasting to everlasting thou art God;" and as the prince of peace he commands all men to live in peace and amity with each other, "Blessed are the peacemakers," says he, "for they shall be called the children of God."

He is called in the Greek, "Christ," and in the Hebrew, "Messiah;" both which mean anointed by God to the three-fold office of Prophet, Priest, and King.

"I know that my Redeemer liveth, &c." By dying upon the cross he redeemed, or bought us back from sin.

"The Lord our Righteousness." "He who knew no sin was made sin for us, that we might be made the righteousness of God in him."

"Saviour." As our Saviour he came into the world to die on the cross for our sins, that we might be saved from the wrath to come.

In the 1st chapter of St. Matthew he is called "Emmanuel, God with us." He came down from heaven, was made flesh, and dwelt among us.

Q. 14. "Give from Scripture encouragement to transgressors to go back to God." As answered by No. **17.**

"Come unto me all that are heavy laden," &c.
"As I live, saith the Lord, I have no pleasure," &c.
"Turn ye, turn ye, for why will ye die," &c.
"I came not to call the righteous but sinners," &c.
"This is a faithful saying, and worthy," &c.
"He came not to condemn the world," &c.
"They shall call his name Jesus, for," &c.
"The Son of Man is come to seek," &c.
"Behold the Lamb of God," &c.
"He that believeth shall be saved," &c.
&c. &c.

SENIOR DIVISION.

Specimens of Answers to Questions in Geography.

November 29, 1842.

Q. 1. "Give a description of the general aspect of America. What points of resemblance are there between its two continents? What are its chief table lands? Mark the directions in which the chief lines of drainage fall." As answered by No. **5.**

(*Note.*—This answer was accompanied by a very respectable map of America, roughly sketched during the examination.)

America is rugged and indented by the sea on the east coast, but on the west its coast is very regular, with only two exceptions, having a more extensive coast than any other continent except Europe. Its interior aspect is very bold and grand, containing the largest lakes and rivers in any part of the world. In the west the country rises into magnificent mountains, forming the most continuous chain in the whole world, and almost rivalling in height the highest in the old world; between these mountains on the west and the ocean on the east lie extensive plains, stretching from the north to the south of the continent.

The chief points of resemblance between the two are, the enormous rivers which each contains, and the extensive plains in each; also, the governments in each are chiefly republican.

The chief table-lands in North America are, the table-land of Mexico, elevated about 8,000 to 9,000 feet above the sea; the table-land of Central America, not so elevated; in South America are the table-lands of Quito, Potosi, Pasco, and Titicaca, all of them rising to an height of about 9,000 to 11,000 or 12,000 feet.

The chief rivers in North America are the Mississippi, which drains the central and southern parts of North America, and empties itself into

the gulf of Mexico after a course of nearly 4,000 miles. The St. Lawrence drains the east part of North America, and after a course of about 1,700 miles falls into the Atlantic Ocean. The M'Kenzie drains all the north part of America, and falls into the Arctic Ocean after a course of about 1,600 miles.

In South America is the river Amazon, draining the central and east part of South America: falls into the Atlantic after a course of 4,000 miles. The Orinoco, 1,600 miles long, drains the north-east portion. The La Plata drains the country of the Pampas, and falls into the South Atlantic Ocean after a course of 2,000 miles.

There are numerous other rivers which are too small to be here noticed, which drain the west coast of America; but in general the rivers run in a north-east, or east, or south-east direction.

Another point of resemblance in the two continents is the extensive Prairies in North America, corresponding to the not less extensive Pampas of South America; the latter, at one period of the year, producing thistles which attain an height of 10 or 12 feet, while at another period they produce very long grass; the Prairies producing grass which attains, sometimes, the length of 10 to 20 feet.

Q. 5. "Give a general description of the chief physical features of the Holy Land. Do these in any respect differ from the state of things spoken of in Holy Scripture? How do you account for this difference?" As answered by No. **2**.

(*Note.*—This answer was accompanied also by a sketch of the map of Palestine.)

In the north of Palestine are the Lebanon mountains: they enter Palestine on the north in two chains, the one next the sea Lebanon and the other Anti-lebanon; the highest chain is Lebanon, although the highest peak is in Anti-lebanon. One natural defect in Palestine is that no permanent stream reaches the sea, except the river Kishon. In winter, this river is joined by various streams, draining the plains of Esdrælon all across the country; in summer it is a mere insignificant stream, gliding along nearly listlessly.

The Anti-lebanon mountains divide into two branches, which stretch the one on the east and the other on the west of the Jordan; the Lebanon terminates on the sea shore a little above Tyre. The country forms a table-land about Jerusalem, and it gradually declines to the sea on the one side and nearly to the Dead Sea on the other. East of Palestine is the high land of Trachonitis, now called Jebel Hauran. Mount Horeb, the highest peak in Palestine, is called Jebel-esh-Sheikh, or Old Man's Mountain, because the snow which lies upon it lies in streaks like an old man's beard. Mount Tabor, an isolated summit, is a very beautiful mountain, covered with verdure to the very top. The scenery, as seen from it, is magnificent: Jebel-esh-Sheikh in the distance, towering above the other country; the Sea of Galilee, with its limpid water, and the dreariness on the south of the Sea of Sodom and Mount Seir. South of Palestine extends Mount Seir, which is a barren desolate wilderness, inclosing a valley called Wady El Araba.

The principal river in Palestine is the Jordan; the valley in which it flows is called El Ghor, and is enclosed by steep mountains on either side.

The climate of Palestine is hot in summer, in winter not very cold. They have two crops of corn. In the Bible, two seed times and two harvests are mentioned; the same as in the present day. Their rainy season is the three winter months and one autumn month, viz., November, December, January, and February. The climate is, altogether, healthy and moderate.

The country does not differ very much from the general outline of the Holy Writ. Modern travellers have elucidated many passages of Scripture by the remains of several cities, with a slight variation of the name. The length of time between the writing of the Bible and the present, and bad government, has entirely kept the inhabitants from keeping up the cultivation which existed so largely in the time of the writing of the Holy Bible.

Q. 6. "Give a sketch of the journey of St. Paul." As answered by No. 2.

We read that St. Paul, after appearing at the council at Jerusalem, set out from Cæsarea on his voyage, to preach the gospel at Rome. They came to *Myra*, a city of Lycia (this is a seaport town in Asia Minor); they sailed from Myra, and ran under Crete, for the winds were contrary (Crete is Candia), and passed by the Fair Havens (which is on the south of the isle of Crete); and because this was not a fit place to winter in, they intended to sail into Phenice (a little to the west of the Fair Havens); but there arose a tempestuous wind called Euroclydon, and drove us about in Adria (south of the Adriatic Sea). Controversy has arisen about this being the Adriatic Sea; but, from the sequel, we shall find that Adria must have applied to the south of Adriatic as well as the Adriatic now so called. And, fearing lest we should fall on the quicksands—(near the Gulf of Sidra, on the north coast of Africa, are shifting sands; vessels coming near are in very great danger of being lost)—we strake sail, and so were driven. And we fell into a creek by the shore; and when he had all landed, we knew that the island was called Melita (*Malta*:—this is the ground of controversy: some geographers suppose that Adria applied to Adriatic Sea, and Melita to Meleda, a small island in the Adriatic). And we sailed and came to Syracuse—(now what reason would they have for coming to Syracuse if they came from the Adriatic; it is about 50 or 60 miles out of their way. It is, therefore, evident that Malta was the true island called Melita. The Maltese show the site of the house of Publius, the governor, the creek or inlet, and the name Santo Paulo is common all over the island)—and they came to Rhegio (Rhegium, on the Italian coast, in the Strait of Messina), and they landed, and came to Appii Forum and the three taverns—(Appii Forum was on the Appian way leading to Rome). And they came to Rome, and Paul preached the gospel.

Q. 9. "Specify the locality of the chief mineral productions of Europe, noting more particularly those of the British Isles." As answered by No. 1.

The most rich mineral-producing part of Europe is the district about the Ural Mountains, where platinum, silver, gold, and copper are all obtained. In the Carpathian Mountains, Illyria, Spain, and Sweden also a great quantity of metal is found. Illyria and Spain are the chief

places in which quicksilver is obtained; and Sweden is noted for its fine copper. But the most useful metals of Europe are produced in Great Britain, where we find iron, tin, copper, lead, and zinc in abundance. Anglesea is noted for its copper, Cornwall for its tin, Northumberland for its lead; iron is abundantly produced in the district about Stirling, in Scotland, and also in the south of Wales; and zinc is found in Cornwall.

Q. 10. "How do the great mountain ridges of Asia lie? Mark the outlets of its chief rivers." As answered by No. 7.

South of Siberia, running from east to west, are the Yablony and Aldan Mountains, though they might all go under the general name of the Altai system of mountains.

North of Hindostan are the Himalaya Mountains, the highest in the world, rising by successive terraces to a height in some places of from 15,000 to 25,000 feet; but the highest summit, Dhawalagiri, is 28,000 feet high.

Between Independent and Chinese Tartary, running from north to south, is the group of the Hindoo-Coosh Mountains, several summits of which attain a height of 20,000 feet.

Between Affghanistan and Hindostan, running also from north to south, are the Soliman Mountain, or the Mountains of Solomon.

Between the Black and Caspian Seas is Mount Caucasus, the highest summit of which, Mount Elburtz, is 17,500 feet high.

Between Europe and Asia are the Ural Mountains, on an average, about 3,000 or 4,000 feet high, though some summits reach a height of 6,000 or 7,000 feet.

The chief rivers of Asia are the following:—

Siberia
- Irtish, falling into the Obi.
- Obi, falling into the Sea of Obi.
- Yenesei, falling into the Arctic Ocean.
- Lena, falling into the Arctic Ocean.

Segalien, falling into the Gulf of Tartary.
Yang-tse-kiang, and Hoang-Ho, falling into the Chinese Sea.
Irrawaddy, falling into the Gulf of Siam.
Cambodia, falling into the Gulf of Tonquin.
Ganges and Burhampootra, falling into the Bay of Bengal.
Indus, falling into the Sea of Oman or Arabian Sea.
Tigris joins Euphrates, both fall into the Persian Gulf.
Gihon or Oxus, falling into the Sea of Aral.
Sihon, falling into the Sea of Aral.

Senior Division.

Specimens of Answers to Questions set in Mechanics, Hydrostatics, and Natural Philosophy.

November 30, 1842.

Answer to Q. 2. "A B is a lever without weight 16 ft. long, 28 lbs. are hung at A, 3 cwt. at B. D B=6 ft., D E=7 ft.; find the weight necessary at E to produce equilibrium." As given by No. 2.

$$\text{Wt. } P \times AD + x \times dD = W \times BD,$$

by substitution,

$$28 \times 10 + x \times 7 = 112 \times 3 \times 6$$
$$280 + 7x = 18 \times 112$$
$$7x = 18 \times 112 - 280$$
$$x = \frac{18 \times 112 - 280}{7} = 248 \text{ lbs.} = 2\tfrac{3}{4} \text{ cwt.}$$

Answer to Q 3. "$\alpha\beta$ is a cylinder of iron in a horizontal position, each foot of its length weighs 10 lbs.; its length=12 feet. At γ (15 feet vertically above β) is a pulley; 3 feet from the extremity α is suspended a weight of 3 cwt.: find the power which, attached to a line passing from extremity α over the pulley at γ, will keep the cylinder horizontal." As given by No **6**.

The leverage with which the weight P acts will be a line let fall, perpendicular to the direction of the force C A.

$$CA = \sqrt{15^2 + 12^2} = 19{\cdot}2.$$

Then $$\frac{15}{19\ 2} = \sin \angle CAB = {\cdot}78125;$$

now B C A is right-angle triangle, where B A is the hypothenuse;

$$\therefore {\cdot}78125 \times 12 = BG = 9{\cdot}375$$
$$120 \times 6 \text{ ft.} + 336 \text{ lbs.} \times 9 \text{ ft.} = x \times 9{\cdot}375$$
$$\frac{720 + 3024}{9{\cdot}375} = x$$
$$399{\cdot}3 \text{ lbs.} = r.$$

Answer to Q. 4. "Find the advantage gained in an axle of two different thicknesses, the diameters being respectively 3 and 4 inches, the string coils round in opposite directions; the power acting at a distance of 9 inches from the centre." As given by No. **3**.

$$\frac{4 \times 3.1416 - 3 \times 3.1416}{2} = \text{space passed over by W,}$$
$$18 \times 3.1416 = \text{space passed over by P,}$$
$$\frac{4 \times 3.1416 - 3 \times 3.1416}{2} = 1.5708$$
$$18 \times 3.1416 = 56.5488$$
$$\frac{56.5488}{1.5708} = 36 = \text{advantage gained.}$$

Answer to Q. 6. "A body falls from the top of a tower 350 feet high, at the same instant another body falls from a window in the tower 50 feet from the top, find the times in which each reaches the ground to two decimal places of seconds." As given by No. **9**.

The time in which any body falls to the earth is found to be equal to the space passed over, divided by 16, and the square root taken;

$$\therefore t^2 = \frac{350}{16}; \quad \therefore t = \sqrt{\frac{350}{16}} = \frac{18{\cdot}708}{4} = 4{\cdot}677:$$

and for the second body we shall have

$$t_1^2 = \frac{300}{16}; \quad \therefore t_1 = \sqrt{\frac{300}{16}} = \frac{17{\cdot}37}{4} = 4{\cdot}3425.$$

Answer to Q. 7. "Define the centre of pressure. Show where its position will be, and find the whole pressure on a rectangular floodgate 36 feet deep, 12 feet wide, when the water comes to the brim." As given by No. 7.

The centre of pressure is that point where all the pressure of the fluid, if brought to one point, would act. This point is always at two-thirds the depth of the fluid, or one-third from the bottom of the vessel, or from the base of anything against which the fluid is exerting its pressure.

$$36 \times 12 = 432 \text{ sq. ft. the area of the gate,}$$

$$432 \times 36 \times \frac{1000}{16} = \text{lbs. pressure on the floodgate:}$$

supposing it to form the base of a vessel,

$$432 \times \frac{18}{3\cancel{6}} \times \frac{1000}{16} \times \frac{\cancel{2}}{\cancel{2}} = \frac{27}{\cancel{4}3\cancel{2}} \times 18 \times \frac{1000}{\cancel{1}\cancel{6}} = 486{,}000 \text{ lbs.}$$

Answer to Q. 8. "The weight of a vessel full of distilled water is 9 lb. 7 oz., a body whose weight is $10\frac{1}{2}$ ozs. being immersed, the whole weight is 9 lbs. $7\frac{1}{4}$ ozs., find the specific gravity of the body immersed." As given by No. 6.

9 lbs. 7 ozs.
9 lbs. $7\frac{1}{4}$ ozs.

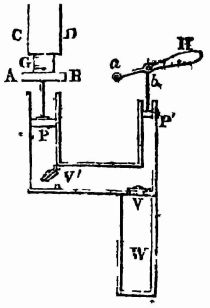
Subtract top from bottom = $\frac{3}{4}$ oz. = weight of body above equal bulk of water.

$10\frac{1}{2}$ ozs. — $\frac{3}{4}$ ozs. = $9\frac{3}{4}$ ozs. = weight of water equal in bulk to body.

Then $9\frac{3}{4} : 1000 \text{ ozs.} :: 10\frac{1}{2} : 1076 \cdot 90 \text{ ozs.}$ = specific gravity of body.

Answer to Q. 9. "Describe Bramah's press, and find the advantage gained when the smaller piston acts at $1\frac{1}{2}$ inches from the centre of motion, the power acting at 12 inches, the diameter of the smaller piston $\frac{1}{2}$ inch, that of the larger 10 inches." As given by No. 4.

The hydrostatic press is at present in very common use.



W is the well from which water is obtained; V is the valve through which the water passes; P′ is the piston of the small pipe; V′ is the valve through which the water passes into the large pipe; P is the piston of the large pipe; to the rod which is connected the board A B; G represents some goods which are to be pressed or brought into a smaller compass.

Mode of action.—On the ascent of P′ the valve V rises by the pressure of water beneath; upon the piston descending, the valve V closes by the pressure of water above it; and the valve V′ opens and admits the water below the piston P; the motion continues thus till the water under the piston P forces the board A B up, and the body is compressed between the boards A B and C D.

For the advantage gained.—The diameter of P′ = $\frac{1}{2}$ in.; diameter P = 10 in.; *ab* = $1\frac{1}{2}$ in.; A H = 12 in.

$$\frac{12 \text{ in.}}{1\frac{1}{2} \text{ in.}} = 8 = \text{advantage gained by handle.}$$

$\frac{10^2 \times \cdot 7854}{\frac{1}{2}^2 \times \cdot 7854}$ = advantage gained by piston.

$\frac{100}{\cdot 25} = 400$ = advantage gained by piston.

400×8 = the whole power gained.

32000 = the whole power gained.

Answer to Q. 10. "A vat, 12 feet in diameter, closed at top and bottom that would burst under a pressure of 9 tons, is filled through a pipe passing into the top, how high may the pipe be carried with safety?" As given by No **7**.

The question reduces itself to this:—the finding what height a vat must be which if filled with water would burst, if obliged to sustain a pressure of 9 tons.

$12^2 \times \cdot 7854$ = area of base of the vat;

then we have to find the height of the water to produce a pressure of 9 tons.

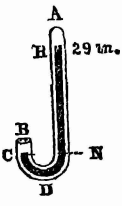
Put x = height.

$$12^2 \times \cdot 7854 \times x \times \frac{1000}{16} = \text{pressure on base.}$$

$$= 9 \text{ tons, or } 20160 \text{ lbs.}$$

$$x = \frac{20160}{\frac{144}{9} \times \cdot 7854 \times \frac{1000}{16}} = \frac{20160}{9 \times \cdot 7854 \times 1000} = 2 \cdot 852 \text{ ft.} \quad \textit{Ans.}$$

Answer to Q. 11. "Describe the barometer, explaining the principle on which it acts. What are its uses?" As given by No. **7**.



The barometer is a bent tube, such as A D B, hermetically sealed at A, but open at B. We shall suppose, for convenience' sake, that the bore of the tube is exactly 1 square inch, then about 15 lbs. weight of mercury is put into the tube, through the orifice at B. The pressure of the air on the mercury at the open end B will cause the mercury to remain in the tube as high as R, which is generally from 28 to 30 inches above the level of the mercury in the side c of the tube. Now the weight of a cubic foot of mercury is about 13′500 ozs. Hence

$$\frac{1 \times 30 \text{ ft.}}{1726} \times \frac{13500 \text{ lbs.}}{16} = 14 \cdot 65 \text{ lbs.},$$

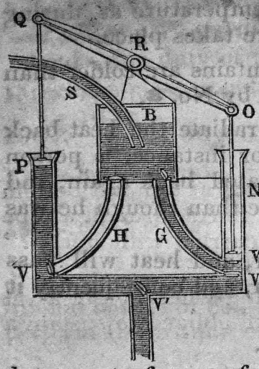
the weight of the mercury from N to R; hence we should conclude that the pressure of the atmosphere on the square inch at B is about 14·65 lbs.

The two chief uses to which the barometer is applied are—

1st. To ascertain the state of the weather: when the mercury sinks we might expect rain; when it rises dry weather, and so on.

2nd. To ascertain the height of mountains: on ascending the mountain the atmosphere, of course, decreases as regards its elasticity, so that part of the weight or pressure being removed from the open end of the barometer, the mercury would sink to a corresponding degree in the long side of the tube.

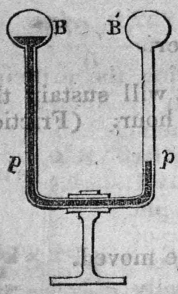
Answer to Q. 12. "Show by a drawing the mode of action in the fire-engine." As given by No. **1**.



The annexed figure shows the principle on which the common fire-engine acts; though not the shape of one.

P V N W is one continuous pipe, in which are the valves V, V′, and V″; all of which open upwards. P and W are pistons, worked in their cylinders P V and W N by rods Q P and O W, which are attached to the beam Q O, acting upon the joint R. V′ allows water to enter the pipe from a well below; B is a box into which water ascends through the pipes G and H; part of the box, however, containing air.

Mode of action.—Water ascends into the pipe V N, a vacuum having been created by the ascent of one of the pistons, suppose it to be P. Then, when P descends, it will close the valve V, and force the water into B, through the pipe H. Meanwhile the piston W has ascended, and the pipe W N is filled with water. Then, when P ascends again, W will descend, and force the water up the pipe G into the air-vessel B. So on the pistons perform their strokes, and the air in B being compressed, its elasticity will force the water in the air-receiver up the leathern hose R, by which the water is discharged into the air.



Answer to Q. 13. "Explain the differential thermometer." As given by No. 5.

B B′ are two balls connected with each other by a pipe *p*, which is filled with liquid; when heat is applied at B, the liquor descends in the pipe *p*, and rises in the ball B′; and when heat is applied at the ball B′ the liquor rises into the ball B.

Answer to Q. 14. "Mention briefly the chief properties of elastic fluids; notice also some of the most familiar effects of the elasticity of the atmosphere." As given by No. 6.

The chief properties of elastic fluids are, that they can be condensed; they possess weight, exert pressure inversely as their volume. Owing to the elasticity of the atmosphere we are enabled to throw water to a considerable height, as in the case of the fire-engine, forcing-pump, &c. The air-gun is constructed on the principle of the elasticity of the atmosphere.

Answer to Q. 15. "Give Dr. Wells's theory of dew." As given by No. 8.

When dew is most plentifully formed it is of a clear night.

The earth during the night radiates its heat which it has acquired during the day, but then there is nothing to radiate its heat back again, consequently the air above the land becomes colder than during the day, and therefore deposits its moisture in the form of dew; but of a night, when the clouds are not much above the land, they radiate their

heat back, and thus keep the air in the same temperature as during the day, and consequently no deposition of moisture takes place.

Answer to Q. 16. "Explain why the tops of mountains are colder than the surrounding lowlands." As given by No. **8**.

On the tops of mountains there is nothing to radiate the heat back again the same as there is in the valley. Thus, for instance, a person in a room surrounded by walls has the heat radiated back again, and therefore he is kept in a higher state of temperature than though he was out of the house.

The air also on the top of a mountain is rarer, and heat will pass through rare much quicker than through dense air, and consequently it will the sooner lose its temperature.

Senior Division.

Specimens of Answers to Questions set on the Steam-Engine.

December 1, 1842.

Answer to Q. 1. "Find the horse power of an engine that will raise 100 cubic feet of water per minute from a depth of 600 feet." As given by No. **3**.

$100 \times 62{\cdot}5 =$ weight of water.

$100 \times 62{\cdot}5 \times 600 =$ units of work.

$$\frac{100 \times 62{\cdot}5 \times 6001}{33000} = 11306 \text{ horse power.}$$

Answer to Q. 2. "Find the power of an engine that will sustain the motion of a train weighing 50 tons at 20 miles per hour. (Friction 8 lbs. to the ton.)" As given by No. **5**.

$$\frac{8}{2240} = \text{friction against a ton.}$$

$$\frac{8}{2240} \times 50 = \frac{400}{2240} \text{ of a ton} = 400 \text{ lbs.} = \text{resistance moved.}$$

$$\frac{400 \times 20 \times 5280}{60 \times 33000} = \frac{704}{33} = 21\tfrac{1}{3}.$$

Ans. $21\frac{1}{3}$ horse power.

Answer to Q. 3. "Find the power of an engine the pressure on the piston being 10 lb. per square inch, the elasticity of steam in the condenser 2 lb. per square inch, the piston 5 ft. in diameter, stroke 8 ft. 15 single strokes per minute." As given by No. **7**.

10 lbs. − 4 lbs. = 6 lbs. effective pressure on each square inch of the piston.

$60^2 \times {\cdot}7854 =$ area piston in inches.

$60^2 \times {\cdot}7854 \times 6$ lbs. = whole effective pressure on piston.

$60^2 \times {\cdot}7854 \times 6 \times 8 =$ units of work in 1 stroke.

$60^2 \times {\cdot}7854 \times 6 \times 8 \times 15$ strokes = units of work in 15 strokes.

$$\frac{60^2 \times {\cdot}7854 \times 6 \times 8 \times 15}{33000} = \frac{36 \times {\cdot}7854 \times 6 \times 8}{22} = 61{\cdot}6896 \text{ horse power.}$$

$$\frac{7}{22}$$

Answer to Q. 4. "How many bushels of coals will raise 150 cubic feet of water per minute, the depth of the shaft 100 fathoms, the day 24 hours, the duty of the engine 60,000,000." As given by No. 1.

150×1000 ozs. = weight of water in ozs.

$150 \times \frac{1000}{16} = 150 \times 62 \cdot 5$ = weight of water in lbs.

$150 \times 62 \cdot 5 \times 100 \times 6$ ft. = units of work performed in 1 min. to raise the water.

$150 \times 62 \cdot 5 \times 600 \times 24 \times 60$ min. = to raise the water in 1 day.

Then if one bushel of coals performs 60000000 units of work; if we divide the units of work performed in one day by the units of work done by one bushel of coals, we shall find the number of bushels necessary to perform those units of work which are done in one day.

Or, $$\frac{150 \times 62 \cdot 5 \times 600 \times 24 \times 60}{60000000} = 135 \text{ bushels.}$$

Ans. 135 bushels.

Answer to Q. 5. "From what depth can I raise a weight of 6 cwt. with a rope 4 inches in circumference in 6 minutes with 3 horse power (weight of 1 foot of rope 1 inch in circumference $\cdot 046$)." As given by No. 7.

Put x = depth.

6 cwt. = $112 \times 6 = 672$ lbs.

$\frac{672 \times x}{6}$ = units of work done in raising the weight in 1 min.

$4^2 \times \cdot 046$ = weight foot of rope 4 in. in circumference.

$4^2 \times \cdot 046 \times x$ = whole weight of the rope.

$$\frac{4^2 \times \cdot 046 \times x \times \frac{x}{2}}{6} = \text{units of work in raising rope in 1 min.}$$

$$\frac{672 \times x + 4^2 \times \cdot 046 \times x \times \frac{x}{2}}{6} = \text{whole units of work in raising both weight and rope in 1 min.}$$

$33000 \times 3 = 99'000$ units in 3 horse power.

$$\frac{672 \times x + 16 \times \cdot 046 \times x \times \frac{x}{2}}{6} = 99'000$$

$$672x + \cdot 368x^2 = 594'000$$

$x^2 + 1826x = 1614130$, by clearing coefficient of x^2.

$x^2 + 1826x + 833569 = 1614130 + 833569$

$= 2447699$

$x + 913 = \sqrt{2447699} = 1564 \cdot 5$

$\therefore x = 1564 \cdot 5 - 913 = 651 \cdot 5$ ft. *Ans.*

Answer to Q. 6. "Steam is admitted into the cylinder of a steam engine at an effective pressure of 30 lb. per square inch, the area of the piston 100 inches, length of the stroke 10 feet, steam is cut off at 2 feet, required the units of work performed by one stroke." As given by No. 7.

First we will find the units of work done. Supposing the area piston=1 square inch, the units of work from *d* to A may be represented by the area of the curved space *h d* AB; where units of work from *d* to *e* (fig. 1) is represented by the area of *h g c d* (fig. 2) from *e* to *b*, represented by area *g c b f*, and so on.

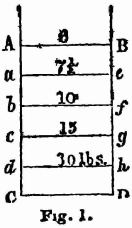


Fig. 1.

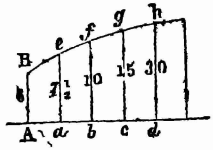


Fig. 2.

Thomas Simpson's rule for finding the area of a curve space is:—to add together the extreme ordinates, 4 times the sum of the even ordinates, and twice the sum of the odd ones, and multiply the whole sum by $\frac{1}{3}$ the distance between any two ordinates. (The ordinates must be equidistant.)

When steam has expanded to twice its volume, its elasticity is decreased one half; when it has increased to three times its former volume, $\frac{1}{3}$; and so on.

Hence $\frac{30}{2}$ = 15 lbs. on square inch = pressure at *c*.

$\frac{30}{3}$ = 10 lbs. on square inch = pressure at *b*.

$\frac{30}{4}$ = $7\frac{1}{2}$ lbs. on square inch = pressure at *a*.

$\frac{30}{5}$ = 6 lbs. on square inch = pressure at A.

Area A*dh*B (fig. 2) $= \frac{1}{3}$ A*a* $\{dh + BA + 4(gc + ca) + 2(fb)\}$
$= \frac{2}{3}\{30 + 6 + 4(15 + 7\frac{1}{2}) + 2 \times 10\}$

But this only gives us the units of work from *d* to A, during the period that the steam works expansively: we must add to this the units of work on each square inch from *c* to *d*.

30×2 = units from *c* to *d*.

Units from *c* to A $= \frac{2}{3}\{30 + 6 + 4(15 + 7\frac{1}{2}) + 2 \times 10\} + 30 \times 2$

These are the units only on 1 square inch: to find the units on the whole piston, which is 100 square inches, we × this by 100.

Whole units of work $= (\frac{2}{3}\{30 + 6 + 4(15 + 7\frac{1}{2}) + 2(10)\} + 30 \times 2)\ 100$
$= (\frac{2}{3}\{36 + 90 + 20\} + 60)\ 100$
$= 157\frac{1}{3} \times 100 = 15700 + 33\frac{1}{3} = 15733\frac{1}{3}$

Answer to Q. 7. "Describe the chief parts of the double-acting steam-engine." As given by No. 8.

The *damper* is used to regulate the elasticity of the steam, in conjunction with the part of the machinery which supplies water to the boiler. When the elasticity of the steam becomes very great, the water will be pressed up the pipe *p*, and consequently the float will ascend with the water; but when the float ascends, the rope *n* also ascends and passes over the pulley, over the next pulley, and causes the rope *p* to descend, or rather the damper L; it then partly closes the flue, and the fire becomes less, the temperature of the water decreases, and consequently the elasticity becomes less, and *vice versâ*. When the elasticity is not sufficient, the water sinks, and with it the float, the damper rises, and the fire increases.

The *safety valve* also is used to regulate the steam. When the steam in the boiler rises to a great elasticity, more than is wanted, the steam is allowed to pass out of the boiler. The weight P is also used in the regulation. A lever of the second kind is seen in the rod A B. P is used by the pump upon the principle of this lever. The quantity of steam, or the pressure required, is known, P is accordingly placed at such a position as to balance this pressure, and as soon as the steam has a pressure greater than is wanted, it consequently raises the valve and escapes.

The *crank* is used to convert the oscillating motion of the beam into the rotatory motion of the fly wheel, thus rendering the engine available for all machinery. It consists of a long bar of iron, which is connected with a shorter piece of iron fastened to the centre of the wheel. When the beam ascends, it raises the bar of iron; but the shorter not being in a vertical line, it does not ascend perpendicularly, but only allows one end to rise, while the other, instead of rising, is connected with the wheel, and gives to it a rotatory motion.

JUNIOR DIVISION.

Specimens of Answers to some of the Questions set in Arithmetic.

November, 1842.

Q. 13. "I own $\frac{3}{5}$ths of a coal-mine, and sell $\frac{2}{3}$ths of my share for 1710*l.*, find the value of the whole mine." As answered by No. **28.**

$\frac{2}{3}$ of $\frac{3}{5}$ is $\frac{2}{5}$ sold for 1710*l.*;

9 : 20 : : 1710

1 190 × 20 = 3800.

Worth of the whole mine 3800*l.*

JUNIOR DIVISION.

Religious Instruction.

November 25, 1842.

Q. 7. "Give some account of the parable of the Ten Virgins: what lesson do you draw from it?" As answered by No. **22.**

It was customary among Eastern nations, on the occasion of a bride being led to the house of the bridegroom, for her friends and relations to accompany her in procession, bearing lights, &c., with great pomp and rejoicings; the parable of the ten virgins is an allusion to this ceremony, which was always conducted at night.

The spiritual application of the parable:—Our Saviour Jesus Christ is the bridegroom, his bride is the church; the five wise virgins are those who have embraced his religion, and follow in his ways, through faith and the grace of God; the foolish virgins are those who, having received a knowledge of his gospel, are yet careless of their future state, and neglect the means afforded them in this world, which, with the grace of God, will insure their admission into eternal life. By the oil in the parable we may suppose is meant the grace of God, which we may obtain by prayer and repentance.

We may learn also that we should not neglect the present oppor-

tunity of providing ourselves with that grace of God necessary to our salvation, lest the bridegroom come, and, finding us careless and sleeping, close the gates of his mansion against us.

Part of Q. 8. "Give some account of the life of Saul the persecutor." As answered by No. **21.**

St. Paul was born at Tarsus, a city in Cilicia, of Jewish parents, and belonged to the sect of the Pharisees; was brought up at the foot of Gamaliel; he persecuted the Christians with great rigour; and was on his journey to Damascus to persecute the Christians, when he was miraculously converted by our Lord appearing to him, at noon-day, in a bright shining light, so that he fell down; and a voice said unto him, "Saul, Saul, why persecutest thou me." From which time he preached the gospel, making many converts in Asia, Asia Minor, Greece, the Grecian Archipelago; and by some he is supposed to have preached in Britain. He was called the apostle of the Gentiles; he also suffered martyrdom under Nero, in the year of our Lord 65.

JUNIOR DIVISION.

Specimens of Answers to Questions in Geography.

November, 1842.

Q. 3. "What is included under the name of Polynesia?" As answered by No. **21.**

Polynesia, includes those groups of islands lying in the Pacific Ocean, which are classed under six divisions, viz.—

1. The Sandwich. 2. The Carolines. 3. The Ladrones. 4. The Marquesas. 5. The Society, and—6. The Friendly Islands, partly of coral formation.

Q. 4. "Give as accurately as you are able the localities of the manufacturing and mining populations of Great Britain; and show how its physical features have influenced its commercial aspect." As answered by No. **31.**

The principal seats of the cotton manufactures are Manchester, Bolton, Bury, Oldham, &c.: of the woollen manufactures, the West Riding of Yorkshire, in which are the towns of Leeds, Halifax, Bradford, Huddersfield, &c. The inhabitants of these towns are chiefly engaged in the production of woollen cloths, both for home and also for foreign consumption. For crape, &c., Norwich. For carpets, Kidderminster. For lace, stockings, and all kinds of hosiery, Nottingham and Leicester For earthenware, Staffordshire. For all kinds of iron manufacture, Birmingham, Wolverhampton, Dudley and Sheffield, also Dean Forest, Colebrook Dale, &c. An extensive manufactory of shoes, boots, &c. is carried on at Stafford. The inhabitants of all the foregoing towns are actively engaged in manufacturing the various articles named, and the places are distinguished as thriving, busy, and flourishing towns.

In Scotland, extensive manufactures of cotton are carried on in Glasgow, Paisley, Lanark, &c. Iron is also extensively wrought at the Carron Iron Works (celebrated as being the largest in the world),

Glasgow and Berwick-on-Tweed. Plaids are manufactured in Stirling. Linens at Dunfermline and Dundee.

In Wales, iron, copper, &c., are the chief manufactures in minerals; these are carried on to a great extent at Merthyr Tydvyll and Swansea. Cotton is also manufactured in Merthyr Tydvyll and Holywell.

There is an extensive manufacture of flannels, and various kinds of woollens, carried on as a domestic employment among the Welsh.

The principal seats of the mining operations are Derbyshire, where immense quantities of lead and copper ore, and also a small quantity of silver, are procured annually:—Cornwall, where tin, lead, and copper are procured, especially the former; and it is remarkable that this is the only place where tin is to be found in large quantities. Truro is the centre of this trade.

Lead is procured in Furness, the northern portion of Lancashire, also in Cumberland. There is also a species of mineral, called black-lead, which is to be found in Borrowdale, in Cumberland. Iron is found in the Forest of Dean, in Gloucestershire, in the county of Warwick, round Birmingham, &c.

In Wales, iron is found in Glamorganshire, around Merthyr Tydvyll, and in Anglesea.

Coals are abundant in many parts of England, Scotland, and Wales: the largest of the great coal basins is in South Wales, stretching across the whole of the southern portion, from Pembroke to Glamorgan; and it is procured in such quantities, that copper is brought from Chili in South America, and from the coast of Cornwall, in order to be smelted there, in consequence of the cheapness of the fuel.

The best coals are procured from the Newcastle coal basin, in Northumberland. The working of these mines give employment to thousands of persons, and has been the means of forming the extensive towns of Newcastle, Sunderland, Stockton, North and South Shields, &c.

The southern part of Lancashire has a very extensive coal field, which supplies the various manufactories of cotton, one branch of trade thus acting, as it invariably does, as the handmaid of the other.

These are the principal seats of mining and manufacturing industry in Britain. The principal physical features of the country are—the indentation of the coast, thus forming numerous fine, open, and spacious harbours, which offer every advantage for the carrying on an extensive trade with other nations. The numerous navigable rivers, which afford a ready means of transit for goods, sent from one town to another, and its inexhaustible supply of mineral wealth; the latter substance may be termed the sinews of the country. Iron enables us to build immense steam-boats which plough the ocean in every direction, spreading the commerce of our land over the known world. Coal enables us to set the mighty engines in motion, producing effects calculated to astonish and confound.

The same. As answered by No. 11.

The principal manufacturing counties are Yorkshire, Lancashire, Nottingham, Cheshire, Stafford, Leicestershire. In Scotland, the principal counties are Renfrew, Lanark and Fifeshire. The chief place in Yorkshire is Leeds, on the river Aire; it is the great centre of the woollen manufacture of Great Britain; in Lancashire, the great seat of the cotton manufacture is at the town of Manchester, and the surrounding

district. In Nottinghamshire, at the county town of the same name, is the great seat of the cotton-stocking manufacture, while in Leicestershire, at its capital of the same name, is the centre of the woollen-stocking manufacture. In Scotland is the great town of Glasgow—which is next to London in population, and next to Manchester in cotton manufacture—the first city in Scotland; and round Paisley it is also carried on to a great extent. In Forfar and Fifeshire, at the towns of Dundee and Dunfermline, of the woollen manufacture. The great mining districts of England are Cornwall, where there is so much tin and copper; also in Devonshire, and Northumberland and Durham, where are the great coal fields; also in Stafford, where most of the iron mines are; and also in Derbyshire. In Scotland, most of the mining is carried on in that part of the country stretching from the Firth of Forth to the Firth of Clyde.

If it were not for our abundance of coal and iron, our manufactures would not be of any importance. It is through this coal that the machines are set in motion, and through these we get our manufactures done so quickly, and export them to all parts of the known world; also it is a good thing that we find our coal nearly always with the iron, for without coal the iron could not be smelted, and would be of very little use to us; so we see that it is through the great abundance of coal that the commerce of Great Britain has been so extensive.

SENIOR DIVISION.

Specimens of Answers to Questions set in Algebra and Mensuration.

March 24, 1843.

Q. 1. "Divide $a^5+5a^4x+10a^3x^2+10a^2x^3+5ax^4+x^5$ by $a^2+2ax+x^2$"

As answered by No. **17**.

$$a^2+2ax+x^2\left\{\begin{array}{l}a^5+5a^4x+10a^3x^3+10a^2x^3+5ax^4+x^5\\ a^5+2a^4x+a^3x^2\end{array}\right.$$

$$\begin{array}{l}3a^4x+9a^3x^2+10a^2x^3\\ 3a^4x+6a^3x^2+3a^2x^3\end{array}$$

$$\begin{array}{l}3a^3x^2+7a^2x^3+5ax^4\\ 3a^3x^2+6x^2x^3+3ax^4\end{array}$$

$$\begin{array}{l}a^2x^3+2ax^4+x^5\\ a^2x^3+2ax^4+x^5\end{array}$$

Ans. $a^3+3a^2x+3ax^2+x^3$

Q. 2. "Multiply $x^2-\frac{x}{2}+\frac{x}{3}$ by $\frac{x}{3}+2$." As answered by No. **4**.

$$x^2-\frac{x}{2}+\frac{2}{3}$$

$$\frac{x}{3}+2$$

$$\frac{x^3}{3}-\frac{x^2}{6}+\frac{2x}{9}$$

$$+2x^2-x+\frac{4}{3}$$

$$\frac{x^3}{3}+\frac{11x^2}{6}-\frac{7x}{9}+\frac{4}{3}$$

Q. 3. "Solve the following equations $x-\frac{x+3}{3}+15=\frac{12x+26}{5}$

$4x^2-3x=85.$

$x=3y$ and $10x+y=x^2+12.$"

(Equation 1.) As answered by No. **22.**

$$2x-\frac{x+3}{3}+15=\frac{12x+26}{5}$$

$$6x-x-3+45=\frac{36x+78}{5}$$

$$30x-5x-15+225=36x+78$$

$$25x-36x=93-225$$

$$225-93=24x-36x$$

$$132=11x$$

$$12=x$$

Ans. $x=12.$

Q. 3. (Equation 2.) As answered by No. **30.**

$$4x^2-3x=85$$

$$x^2-\frac{3x}{4}=\frac{85}{4}$$

$$x^2-\frac{3x}{4}+\left(\frac{3}{8}\right)^2=\frac{85}{4}+\frac{9}{64}=\frac{1369}{64}$$

$$x-\frac{3}{8}=\pm\frac{37}{8}$$

$$x=\pm\frac{37}{8}+\frac{3}{8}$$

$$x=5 \text{ or } -\frac{34}{8} \text{ or } -\frac{17}{4}$$

Q. 3. (Equation 3) As answered by No. **9.**

$$10x+y+x^2+12$$

$$x=3y$$

$$\therefore 10\times 3y+y=(3y)^2+12$$

$$30y+y=9y^2+12$$

$$31y-9y^2=12$$

$$9y^2-31y=-12$$

$$y^2-\frac{31}{9}y=-\frac{12}{9}$$

$$y^2-\frac{31}{9}y+\frac{961}{324}=\frac{961}{324}-\frac{12}{9}$$

$$=\frac{529}{324}$$

$$\therefore y-\frac{31}{18}=\frac{23}{18} \quad \therefore y=3 \text{ or } -1 \; \textit{Ans.}$$

Q. 4. "A certain number of sheep cost 120*l.*, 8 die, the remainder being sold at 8*s.* a head profit, produce 120*l.* Find the number of sheep." As answered by No. **8**.

Let x = number of sheep,
y = cost of each.
$xy = 2400s.$
$x-8$ = those that were left.
$(x-8) : (y+8) = xy - 8y - 8x - 64$
$xy - 8y + 8x - 64 = 120l.$, or $2400s$
$xy - 8y + 8x - 64 = xy$
$8x = 8y + 64$
$\frac{19200}{y} = 8y + 64$
$xy = 2400$
$19200 = 8y^2 + 64y$
$45{\cdot}1\,x = 2400$
$2400 = y^2 + 8y$
$x = 53{\cdot}2 +$
$2416 = y^2 + 8y + 16$
$49{\cdot}1 = y + 4$
$45{\cdot}1 = y$

Q. 5. "Find how many terms of the series 5, 7, 9, &c. must be taken to equal 437." As answered by No. **7**.

Put x = number of terms.

$s = 5 + 7 + 9 + \&c.$
$\therefore$ xth term of this series $= 5 + 2 \times \overline{x-1}$
$= \overline{2x+3}$
$\therefore s = 5 + 7 + 9 + \ldots\ldots \overline{2x+3}$ (1)

Then inverting this series—

$s = \overline{2x+3} + \overline{2x+1} + \overline{2x-1} + \ldots\ldots 5.$

Then by adding these two series together—

$2s = \overline{2x+8} + \overline{2x+8} + \ldots\ldots$ to x terms.

$\therefore s = \frac{\overline{2x+8} \times x}{2} = \frac{2x^2+8x}{2} = x^2 + 4x$
$x^2 + 4x = 437$
$x^2 + 4x + 4 = 437 + 4 = 441$
$x + 2 = \sqrt{441} = 21$
$\therefore x = 21 - 2 = 19$
Ans. 19.

Q 6. "Expand $(x^2+3y)^5$ by the Binomial Theorem." As answered by No. **9**.

$(x^2+3y)^5 = x^{10} + 15x^8y + 90x^6y^2 + 270x^4y^3$
$+ 405x^2y^4 + 243y^5$
$(x^2+3y)^5 = x^{10} + 15x^8y + 90x^6y^2$
$+ 270x^4y^3 + 405x^2y^4 + 343y^5$

Q. 7. "Divide 24 in 2 parts whose product shall be to the sum of their squares : : 3 : 10 : : 3 : 10." As answered by No. **3**.

$x + y = 24$ $\therefore x = 24 - y$
$xy : (x^2+y^2) :: 3 : 10$

$$10xy = 3(x^2+y^2)$$
$$10y(24-y = 3(x4-y)^2+3y^2$$
$$240y-10y^2 = 1728-144y+3y^2+3y^2$$
$$-1728 \qquad = 16y^2-384y$$
$$y^2-24y = -108$$
$$y^2-24y+(12)^2 = -108+144 = 36$$
$$y-22 = \pm 6$$
$$\therefore y = 18 \text{ or } 6$$
and $x = 6$ or 18.

Q. 8. "Find the area of a trapezoid, the parallel sides being 750 and 1225 links and the distance between them 1540 links." As answered by No. 22.

1225
750

2)1975

987·5
1540

39500 0
49375
9875

15·20750
4

8300
40

33·2000

Ans. 15 acres, 0 roods, 33¼ poles.

Q. 9. "A C B and A D C are right angles, A C is 108 yards, C B is 144 yards; find C D, B D, and D A." As answered by No. 7.

AC = 108 yards.
CB = 144 yards.
Find CD, BD, and DA.

$$AB = \sqrt{108^2+144^2} = \sqrt{324\cdot00} = 180$$

Rut $AD = x$,
then $BD^2-DA^2 = BC^2-AC^2$;
or $(180-x)^2-x^2 = 144^2-108^2$
$$32400-360x+x^2-x^2 = 20736-11664$$
$$\therefore x = \frac{32400+11664-20736}{360}$$
$$= 64\cdot8$$
$$\therefore DB = 180-64\cdot8 = 115\cdot2$$
$$DC = \sqrt{AC^2-x^2}$$
$$= \sqrt{11664-4199\cdot04}$$
$$= \sqrt{7464\cdot96} = 86\cdot4$$

$$AC = 30 + \cos 60°$$
$$= 30 + \tfrac{1}{2} = 15$$
$$BC = \sqrt{30^2 - 15^2}$$
$$= \sqrt{675} = 26 \text{ almost.}$$

Q. 10. "A ladder 30 feet long, inclining at an angle of 60° rests against a wall; find the height of its top from the ground, and the distance of its foot from the base of the wall." As answered by No. **5**.

$$AB = \sin 60° \times AC$$
$$AB = \cdot 899 \times 30$$
$$= 26\ 07$$
$$CA^2 = AB^2 + BC^2$$
$$30^2 = 26^2 + BC^2$$
$$900 = 676 + BC^2$$
$$900 - 676 = 224 = BC^2$$
$$\sqrt{224} = BC$$
$$14 \cdot 9 = BC$$

Ans. 26 and 14·9.

Q. 11. "Find the area of a sector, where the radius is 9 feet, and the chord of the arc 6 feet." As answered by No. **21**.

$$9^2 - 3^2 = ab^2$$
$$81 - 9 = ab^2$$
$$\sqrt{72} = ab$$
$$8\ 4 = ab$$
Then $9 - 8\ 4 = \cdot 52 = ae$
$$3^2 + 52^2 = ce^2$$
$$9 + \cdot 2704 = ce^2$$
$$\sqrt{9\ 2704} = ce$$
$$3\ 04 = ce$$

3·04
8

24·32
6·00

3)18·32

6·106 = Arc. *cd*
9 = radius.

2)54·954

27·477 Area.

Q. 12. "Find the acreage of a triangular field, the sides being 380, 420, and 765 yards." As answered by No. **6**.

380	782·5	782·5	782·5
420	380	420	765
765	402·5	362·5	17·5
2)1565			
782·5			

$$\sqrt{782\cdot5\times402\cdot5\times362\cdot5\times17\cdot5}=$$
Area in yards=
$$\sqrt{1998003675\cdot9375}=$$
44699·03 yards.
22 yards=1 chain, or 100 links.
10 square chain=1 square acre; ∴
10 × 220 yards square=1 square acre;
=4840 yards. &c. an acre.

```
                          Acres.
4840)44699 : 03(9·2297
     43587            4
     ------      ------
      1112·0     ·9188
        9680        40
        -----    ------
        14403   36·7520
         9680
         -----          9 acres, 0 roods, 36 poles.
         47230
         43560
         -----
          36700
          33880
          -----
           2820 roods.
```

Q. 14. "State Thomas Simpson's rule for finding the area of irregular figures, and give a practical exemplification of it in a particular case." As answered by No. 5.

Add together the extreme ordinates with four times the sum of the odd ordinates' and twice the sum of the even ordinates, and multiply this by $\frac{1}{3}$, the distance between each ordinate.

$$\tfrac{12}{3}\{(5+6)+4(7+8)+2(10)\}$$
$$4\{11+60+18\}$$
$$4\{89\}=356=\text{area.}$$
Ans. 356 area.

In the example here given the ordinates are 5, 6, 7, 8, and 10, and the distance between them is 12.

Senior Division.

Specimens of Answers to Questions in Religious Instruction.

March 27, 1843.

Q 1. "What is meant by the doctrine of the atonement. Give Scriptural grounds for your statements on this head." As answered by No. 40.

By atonement is meant the reconciling or setting *at one* again those who had been at variance. By Adam's transgression man had become subject to death—temporal, spiritual, and eternal. "The soul that sinneth it shall die;" and it was impossible for man "to redeem his brother, or make atonement unto God for him," for the offence was in-

finite, and demanded an infinite saviour. The justice of God, therefore, demanded that, as man had incurred the penalty due to sin, he should suffer it; but his mercy provided "a lamb for an offering." He promised a "seed who should bruise the head of the serpent," and destroy the "sting of death," which is sin—"putting away sin by the sacrifice of himself." "God so loved the world that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life." Jesus Christ, the only begotten Son of God, took our nature upon him; took the form of a servant; being in all points like as we are, but without sin: and being infinitely good, and an infinite being, could atone for our transgressions: thus was justice satisfied, and a place found for mercy. "Mercy and truth met together; righteousness and peace kissed each other;"—and, as in Adam all die, so in Christ shall all be made alive—for he has quickened us who were dead in trespasses and sins.

The general notion of atonement by a substitute seems to have been very general in all countries and in all ages. The sacrifices of animals, and even of human victims, among the Greeks and other nations of antiquity; by the Druids in our own British island; and the people of Hindoostan in the present day; the children offered to Moloch by the idolatrous Canaanites, whose example was copied by some of the Jews. The question Balak asked Balaam (as we find recorded in Micah), "Shall I give my first-born for my transgression?" is another proof of the extent of the notion of propitiatory sacrifices. But it was only among the people of God, who were favoured with the oracles of God, that they were able by faith to offer an acceptable sacrifice. The scape-goat, who bore away on his head the people's trespass; the dove killed, that his fellow, dipt in his blood, might be let free; the lamb slain daily; the paschal lamb; and the sacrifice on the great day of atonement—all showed forth in types the "Lamb of God" pointed out by the Baptist, and showed our Saviour's face to all who looked on these sacrifices with the eye of faith. He came to do his Father's will; for "it was impossible that the blood of bulls and goats should take away sin." "He came to put away sin by the sacrifice of himself;" and "by this one oblation of himself once offered" acting as high priest and being himself the sacrifice) made "a full, perfect, and sufficient sacrifice, oblation, and satisfaction for the sins of the whole world;" and having made the sacrifice for all, he entered not into the holy of holies, but into heaven itself, to plead the merits of his atoning blood in our behalf. Thus was God reconciled to man; and, being justified freely by his grace, all who believe in him may be saved; "being justified by faith, we have peace with God, through Our Lord Jesus Christ; and thus man becomes reconciled to God."

Q. 2. "Show from the Bible that we are encouraged and commanded to trust to God's providence for ordering aright matters that may seem of small importance as well as great matters." As answered by No. 31.

"All things are ordered for good, to those who lead a godly life." Again, "*Whatsoever* ye ask in my name, believing, it shall be given unto you." Such are the never-failing promises of Jehovah, and "God is not a man that he should lie." Jesus Christ himself declared, "Even the very hairs of your head are numbered." "Cast thy burden upon the

Lord and he shall sustain thee." And we have the evidence of the sweet singer of Israel, "I was young and now am old, yet never saw I the righteous forsaken, or his seed begging their bread." Are not two sparrows sold for a farthing? says our Saviour; and yet he declares "that not even a sparrow falleth to the ground but our heavenly Father knoweth it;" and then he adds, "Ye are of more value than many sparrows." Again, "Take no thought what ye shall eat, or what ye shall put on, for God careth for you." We have many examples in the Scriptures of the particular providence of God, in the preservation of Joseph, David, Jeremiah, Noah, Jacob, Hezekiah, and all the apostles; and, in short, we may see around us, day by day, undoubted evidence that God careth for the righteous.

Q. 3. "Show that our Lord Jesus Christ was truly, and in the highest sense, God." As answered by No. **39**.

1. It was prophesied that he should be God. Isaiah calls him *The mighty God, the everlasting Father.* Jeremiah calls him *The Lord our Righteousness.*

2. His miracles prove him to be God; for though the prophets of old did many great and wonderful miracles, they did them in the name and by the authority of God, but he did them in his own name, and by his own power: his apostles after him also worked miracles in his name.

3. He declares himself, and is declared to be, God. He says, "I and my father are one." John says, "The word was God, and was made flesh." St. Paul says, "In him dwelt all the fulness of the Godhead bodily."

Q. 4. "Show how the time, place, and manner of our Saviour's birth were limited by prophecy." As answered by No. **5**.

"Seventy weeks are determined upon the holy city," &c.

"The sceptre shall not depart from Judah," &c.

"And thou, Bethlehem Ephrata, though thou be little," &c.

"Behold a virgin shall conceive and bear a son," &c.

Q. 5. "In what respects do Isaac, Joseph, and David seem to have been types of our Lord." As answered by No. **24**.

Isaac is a type of Christ, in his being offered as a sacrifice by his father, and in his bearing the wood (on which he was to be laid) up the hill. Christ was made to bear his cross. Isaac is a type, in that he offered himself willingly; for at this time, it has been ascertained, he was nearly the same age as Christ was when he suffered, and consequently he was of sufficient strength to have resisted his father, who was then an old man. Isaac was a type, in that he was received as it were from the dead; "From which also Abraham received him in a figure."

Joseph was a type in his being sold by his brethren. Christ was sold by one of his followers. Joseph was taken to prison, and afterwards rescued, and promoted next to the king. Christ was taken to prison, and death; and he rose again from the dead, and now is sitting at the right hand of the Father. It was through Joseph that the inhabitants of the surrounding countries were saved from starvation; and it is through Christ that sinners are saved, and that believers receive the gift of the Holy Ghost.

David was a type of Christ, in that he was appointed by God to be

the saviour of Israel from the hand of their enemies. Previously to his becoming king, he was persecuted and his life was sought by Saul. Herod the King of the Jews sought to slay Jesus.

Q. 6. "Cite passages from the Liturgy in which the truth is recognized, that all that is good in us comes only from God." As answered by No. **3**.

"O God, from whom all good things do come."

"O God, from whom all holy desires, all good counsels, and all just works do proceed."

The same. As answered by No. **40**.

"O God, from whom all good counsels, all just works do proceed," &c.

"Almighty God, the giver of all goodness, &c., who seest that we have no power of ourselves to help ourselves."

Q. 7. "Show from the precepts and examples of Scripture the full character of that love which all of us are required to bear one towards another." As answered by No. **4**.

"Return good for evil." "Do good." "And pray for them that despitefully use you and persecute you."

"When he was reviled, he reviled not again."

"Let the love of God," &c.

"Love the brotherhood."

"Do to all men as ye would that they should do to you."

"Love one another, even as Christ has loved us."

Abraham, when he interceded for the preservation of the cities of the plain, showed great love for his fellow-creatures.

"Be kind and charitable one towards another, forgiving one another in love."

Q. 8. "Explain and give Scriptural grounds for the statement, that at our baptism we are made members of Christ, children of God, and heirs of heaven. Does our Saviour teach that all those that are joined to him will remain with him for ever?" As answered by No. **1**.

By being made "members of Christ" is meant, being made a member of his church, which is sometimes called "*his body*." St. Paul says, "As many of you as were baptized have put on Christ."

By being made children of God is meant, that he receives us as his adopted sons through being baptized into the name of Jesus; which is signified in the verse preceding the last quotation. By heirs of heaven is meant those who will receive an inheritance in heaven if they become reconciled to God by faith in the atonement made by our Lord, God being already reconciled to man.

St. Paul says, "If children then heirs: heirs of God," &c.

Q. 9, § 1. "Give some account of the lives of Joshua, Samuel, Elijah, St. Paul." As answered by No. **29**.

Joshua was the son of Nun, and appointed to be captain of the children of Israel; he only and Caleb were permitted to enter the promised land of all who came out of the land of Egypt. Joshua was remarkable for his piety; an instance of it is often quoted; he called on the Israelites, saying, "Choose you this day whom you will worship; as for me and my house, we will serve the Lord." He also performed

miracles. One was commanding the sun and moon to stand still while he smote his enemies. He was also a type of Christ, in that he led the people to the earthly Canaan, and Christ opened to us the heavenly Canaan.

Q. 9, § 2. As answered by No. **37.**

Samuel was given in answer to the prayer of his mother, and was presented to the Lord. He was brought up in the temple under the care of Eli. He was called when very young to be a prophet. His first prophecy was concerning the death of the sons of Eli, or the calamity that should come upon Eli's house. He knew the Lord from his youth. After Eli's death he was appointed priest. He appointed or anointed the first king in Israel, and foretold the evils which it would bring on them. He also anointed David to be king.

Q. 9, § 3. As answered by No. **36.**

Elijah was a prophet sent by God, in the time of Ahab, to warn him and the kingdom of Judah of their abominations in forsaking the worship of the true God and falling down to Baal. He destroyed the prophets of Baal on Mount Carmel; was threatened by Jezebel, and fled out of the country; was fed by ravens at the brook Cherith; raised the widow's son; and at last was taken up to heaven without dying.

Q. 9, § 4. As answered by No. **17.**

Paul.—The first mention of Paul is in the account of the stoning of Stephen, where it is said that the persons appointed to stone him "laid down their clothes at a young man's feet named Saul." In the next mention of his name it is said that he made havock of the church, entering into every house and haling men and women, delivering them bound to the high priest. The persecution of the Christians had caused them to remove from Jerusalem, rendering the persecution of Paul, or Saul (which he thought was rendering God service), of little effect. He therefore determined that they should not, by removal, escape his vengeance; and for this purpose obtained authority from the high priest to bring the Christians of every city he met with bound to Jerusalem. With this intention he was proceeding to Damascus, but while on his journey, the glory of the Lord shone round about him, and he heard the voice saying, "Saul! Saul! why persecutest thou me; it is hard," &c. This appearance led to his conversion; after which he ever after remained a faithful adherent to the Church of Christ. This sudden change from the profession of a Pharisee to the Christian religion drew upon him the severest vengeance of the Jews. On one occasion he was obliged to escape their vengeance by being let down without the walls of the city in a basket. He then travelled through various countries. At a place called Paphos he met with Barjesus, who was blind; Paul gave him his sight. At Antioch, being disgusted with the unbelief of the Jews, he turned to the Gentiles. At Lystra he healed a cripple, and at this place was stoned. Paul did not, like many others, live by his preaching, but both preached and worked at his employment. On one occasion he had a quarrel with Peter, who withdrew from the uncircumcised Jews while at meat, and caused great dissimulation, for which Paul severely reproved him. He next had to separate with Barnabas on account of Mark. At Troas he saw the Macedonian in a vision, saying, Come and help us. He also ordered a spirit to come out of a maid. For this he was

whipped, as her masters before obtained great gain by her divination; and he was also imprisoned. Here he began to sing praises to God, during which the prison was shaken to the very foundation. This gave the gaoler great consternation; and by the advice of Paul he was converted. On another occasion he had a dispute with the Athenian philosophers concerning the unknown God. At Ephesus there was a tumult raised, at the instigation of Demetrius, because his gain by the Temple of Diana was in danger. It was at last stopped by the town-clerk. At Miletus we find him delivering his affectionate farewell to the elders. When about to proceed to Jerusalem, we have the prophecy of Agabus by Paul's girdle. At Jerusalem, had he not been rescued by Lysias, he would have been slain. He then made a speech; after which he was ordered to be whipped—when Paul asserted his right as a Roman. During his speech before Ananias he was ordered to be smitten on the face. He afterwards delivered speeches before Felix and Agrippa; after which, finding it impossible to obtain a just sentence, or even a sentence at all, he determined to appeal to Cæsar. While on his way to Rome he was shipwrecked; but, by his righteousness, he and all the passengers were saved. Here, St. Luke informs us, he remained two years, having a soldier bound with him, but was allowed to preach the gospel in his house. He was ultimately beheaded by the [Emperor] Nero, who pretended that the Christians had set fire to a city.

Q. 10. "On what grounds do you believe in the resurrection of the body." As answered by No. 31.

Job, with prophetic fervour, said, "I know that my Redeemer liveth, and that he shall stand upon the earth; and though after my skin worms destroy this body, yet *in my flesh* shall I see God."

Daniel also said, "Many that sleep in the graves shall rise, some to life eternal, and some to everlasting shame and punishment."

Isaiah also, "Thy dead men shall live, together with my *dead body* shall they rise." "He shall change this vile body into a glorious body like unto his own." "For the trumpet shall sound and the dead shall be raised *incorruptible*." And lastly, Christ rose from the dead with his own body, and became the *first fruits* of them that slept, and a pledge of the resurrection of our bodies at the great and terrible day of the Lord.

Q. 11. "Give the meaning of the word parable as it is used in the Scriptures." As answered by No. 1.

Parable, as used in the Scripture, signifies a figurative discourse, a comparison of the things of this world to spiritual things; as, when our Lord compares the gospel to a grain of mustard seed. By this mode of teaching, the facts or precepts intended to be inculcated are more forcibly impressed upon the minds of the hearers. The plain and simple narrative employed in the Bible for parabolic descriptions could hardly fail of being well understood and remembered in vivid characters impressed upon the mind; and this, especially in an oriental nation, where we know that the people are, to the present day, very desirous of listening to fables and stories of any kind for hours together. The earthly meaning, then, being well understood, the spiritual signification would at once occur to the mind, after having once heard it, or diligently thought of it. This mode of teaching also was well adapted by Christ to the Jews; because they would most likely have stoned or otherwise persecuted Jesus, had he taught them plainly.

SENIOR DIVISION.

Specimens to Answers to Questions in Grammar and English History.

March 28, 1843.

Q. 1. "Give some account of the dominion of the Romans in Britain, with the dates." As answered by No. 1.

The establishment of the Roman dominion in Britain was commenced by the celebrated Roman general Julius Cæsar, in the year 55 B. C., when he, after a fierce struggle with the natives, landed on the coast of Kent with a large army. The Britons then showed a pretended submission and gave hostages to Cæsar, who on the approach of winter, returned to Gaul (France) to take up his winter quarters there. In the following spring he again invaded Britain, but found a large body of the natives assembled near the Thames for his reception. These were headed by Cassibelaunus, a native chief, and king of the Trinobantes, the inhabitants of what are now the counties of Essex and Middlesex. Cæsar, however, with some difficulty routed these undisciplined troops, and received, again, the submission of the native chieftains, one of whom he established as governor in his stead. Cæsar now departed from our island to receive the approbation of the Roman citizens, and the nominally conquered country enjoyed a peace of about 97 years. At the termination of this period, Britain was invaded by the emperor Claudius in person (A. D. 43), but his generals and troops met with a determined resistance from the natives, who were arranged under the celebrated British prince Caradoc or Caractacus, who maintained the contest for about nine years. He was at last betrayed into the hands of the Romans, who carried him and his family in triumph to Rome, where, however, his noble bearing procured for him the respect of the people, and the emperor Claudius, who consequently released him. Very little of the country, however, had as yet been conquered, perhaps (as many historians say) no farther north than the Thames; when in the reign of the Emperor Nero the Roman General Suetonius invaded Britain with a large army. His policy was to strike at the root of patriotism in Britain, viz. the Druidical religion, and the chief seat of the king at Mona (the isle of Anglesea). He attacked this island, and, with great trouble, conquered it, and burnt all the Druidical groves. He had no sooner completed this victory, however, than he heard that there was a great rising in the centre of the South, under the British princess Boadicea, who had been led to this conduct by the infamous treatment which she and her daughters had received from some of the Roman commanders.

After some bloodshed (80,000 lives) the Britons were completely subdued in this attempt by the disciplined Romans under Suetonius. Boadicea, lest she should fall into the hands of the Romans, poisoned herself, and most of the Britons submitted to Suetonius. But it was not till the reign of Valentinian in Rome that Britain became really a Roman province. The Roman general at this time was the celebrated Julius Agricola, who invaded Britain with such success that he penetrated as far north as Perthshire in Scotland, with his veteran troops. Here he gave battle to the Caledonians, who were arrayed under Galgacus, their chief, and after a severe contest they were totally defeated by Agricola, who soon after built a line of forts between the Firths of Forth and Clyde, to protect the conquered part of the island from the attacks of the

northern barbarians. Agricola was the first to sail round our island, and he gained a firm footing in the island by his sagacious policy of introducing the luxuries of Rome wherever he obtained a conquest, which of course made the natives more attached to the Roman Government than they would otherwise have been.

The Britons now gloried in being attached to the Roman dominions, instead of opposing Roman sway; and the civilization and religion of Rome (Christianity) gained a pretty sure footing in the island.

At length a time came when Rome could no longer defend her own proper country against the barbarous hordes of central Europe, who poured down upon Rome in such swarms as called forth all the energies of all the Roman troops, who consequently collected in Italy to defend their country. The Roman troops began to be withdrawn from Britain about the year 400, but it was not till about 440 A. D., that they totally quitted Britain, and took with them the flower of the British youth. This departure took place in the reign of Valentinian the Younger, when Stilicho was the Roman General.

Q. 2. "Name the kingdoms of the Saxon Heptarchy, showing the portions of England severally belonging to them." As answered by No. 7.

1. The kingdom of Kent:—Comprehending the modern counties of Kent, Middlesex and Essex.

2. Kingdom of the South Saxons:—Comprehending Sussex, Surrey, and the New Forest (Hampshire).

3. Wessex, or the kingdom of the West Saxons:—Hants, Dorset, Wilts, Berks, and the Isle of Wight.

4. East Anglia:—Norfolk, Suffolk, and Cambridgeshire.

5. Essex:—Formerly a part of Kent, comprehended the modern county of Essex, together with part of Hertfordshire.

6. Mercia:—Comprehending the whole of the midland counties, from the Thames on the South, to the confines of the kingdom of Northumberland on the North; and from Essex and East Anglia on the East, to the Severn on the West.

7. Northumberland.—Containing all the northern counties.

Q. 3. "Who was the first of the Plantagenets; give some account of his character and general policy." As answered by No. 9.

Henry the Second was the first of the Plantagenets. On the whole he was a good king, and England to this day enjoys the benefits of laws of which he laid the foundation. He began his reign by several very popular acts of Government. His second object was that of suppressing the overgrown power of the Popish clergy, whose influence in this reign seems to have been more than that of the King. For this purpose he made Thomas à Becket, archbishop of Canterbury, as he was a man in whom he thought he could put much confidence. But Becket soon espoused the cause of his new order, and became very odious to the King. He was tried, condemned, and banished from the country, but, as the nation were displeased at this, he was allowed to return, and a second time became more odious to the King. He was soon afterwards murdered while at the altar. The latter part of Henry's life was embittered by family dissensions. Though in many respects a weak prince, his reign was a beneficial one. He died in the 35th year of his reign.

Q. 4. "To what reigns would you attribute the introduction of the feudal system. The making Courts of Justice stationary and open to all. Trial by Jury." As answered by No. 5.

The feudal system was introduced into Britain by William the Conqueror, but the making courts of justice stationary and open to all was extorted from John when he signed the Magna Charta, because they had, before this time, followed the person of the king, and justice was not faithfully administered, the advantage being gained by those who could pay the greater sum of money. Trial by jury was founded as early as the reign of Alfred, but it may be said to be revived with full force in the reign of John.

Q. 5. "What was the constitution of the Wittenagemot. How early do we find appeals made to a representative Government for granting supplies." As answered by No. 2.

The Wittenagemot was an assembly of the wise men, or the thanes from each county, which sat to hear the distresses or grievances of the people.

The first representative government was in the reign of Henry the Third, about the year 1271.

Q. 6. "Give some account of the rise and progress of the Reformation in England to the close of Henry VIII's. reign." As answered by No. 5.

The first monarch who attempted to repress the power of the Pope in England was Henry the Second; for this purpose he raised Thomas à Becket to the archbishopric of Canterbury, being a person in whom he placed the utmost confidence. Becket however espoused the Pope's cause more warmly than he did the King's, for which Henry succeeded in banishing him from the kingdom.

However, one person was not sufficient to cope with the Pope and his numerous followers; so that Henry was obliged to submit at the Pope's discretion.

The first person in England that was put to death on account of his religious opinions, was, I think, during the reign of Henry the Third.

However, the Popish party prevailed in England with little interruption, till the reign of Henry the Eighth.

He, however, during the former part of his life and reign, was a zealous adherent of the Catholic Church, and had, by writing a book against the doctrines of the Reformers, obtained from the Pope the title of "Defender of the Faith."

He soon after quarrelled with the Pope, and renounced all allegiance to him, because the Pope would not grant a divorce to separate him from Catherine of Arragon. He, however, did not reject the doctrines of the Church, but published a book requiring all to follow its dictates or to suffer death, and which on that account received the title of the "Bloody Statute." He, however, shortly changed his opinions, and composed a work entitled the "Institution of a Christian Man." He soon after changed his opinions, and published a book, entitled the "Erudition of a Christian Man," to which he also enjoined strict conformity; and all who were not ready to follow him in his changes he ordered to be put to death.

In his reign, too, all the monasteries were suppressed, the funds of which he appropriated to himself, or divided among his favourites.

Instrumental as Henry was in the reformation, every person must shudder at the causes and the means which he took to effect it.

It was not till the reign of Edward the Sixth, his successor, that the Protestant religion was established in the form we now have it.

Q. 7. "From what Latin roots are the words accent, carnage, curry, success, derived; give other instances of words to be traced to the same roots." As answered by No. **22.**

Carnage, from *carnis*, flesh; whence also incarnate, carnivorous, carnival. *Success*, from *sub*, under, and *cedo* to yield, whence also Accede, recede, concede, proceed, cede.

Q. 8. "Parse the sentence*." As answered by No. **23.**

As, a conjunction. *Grammar*, noun, 3rd pers. sing., neut., nom. to teaches. *So*, an adverb, mod. is. *It*, 3rd pers. pron., sing., neut., nom. to is, here used instead of grammar to keep up the application of the noun to another part of the sentence. *Is*, an intrans. verb, 3rd pers. sing., agreeing with its nom. It, in numb. and pers. Verbs must agree with their subject or nom. in numb. and pers. *How*, an adv., mod. to do. Adverbs are used to modify verbs, adverbs, adjectives, and prepositions. *To do*, trans. verb, infin., gov. It in the obj. case, and gov. in the infin. by instruct. One verb governs another in the infin. *It*, 3rd pers. pron. &c., obj. case, gov. by to do. *By*, a prep., gov. in the obj. case, the phrase "adding beauty to that language." *Adding*, imperf. part., of the trans. verb to add, and gov. in the obj. beauty. *To*, a prep., gov. language. The object of a prep. when expressed by a noun or pron. is put in the obj. case. *That*, a num. adj., sing. numb., and making a particular application of the noun language. *That*, a rel. pron, sing. numb., agreeing with its correl. language, in numb. and pers. Relative pronouns agree with their correlatives in numb. and pers., but not in case. *That*, here is nom. to was. *Before*, a prep., gov. time understood. *Was*, an intrans. verb, 3rd pers. sing., agreeing with its nom. that.

Q. 9. § 1. "Give some instances of nouns forming their plurals irregularly after the Saxon mode." As answered by No **6.**

Ox, oxen; Man, men; Woman, women; Child, children.

Q. 9. § 2. "After the Latin mode." As answered by No. **30.**

Animalculum, animalcula; Phenomenon, phenomena; Antithesis, antitheses; Radius, radii; Erratum, errata; Memorandum, memoranda.

Q. 9. § 3. "Other anomalies." As answered by No. **21.**

Mouse, mice; Goose, geese; Knife, knives; Loaf, loaves; Sheep, sheep; Deer, deer; Penny, pence; Box; boxes; Fox, foxes.

Q. 10. "Give instances of the several modes of the formation of adjectives from nouns, where the termination is a guide to the sense." As answered by No. **8.**

—*ous*, meaning *full of*:—Industry, industrious; Nerve, nervous; Magnanimity, magnanimous; Outrage, outrageous, &c.

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* See Note at page 95.

—*ish*, means *a little*:—Black, blackish; White, whitish, &c.
—*al*, belonging to:—Instrument, instrumental.
—*ble*, *full of*:—Value, valuable.

Q. 11. "Mention the chief English conjunctions." As answered by No. **23**.

And, While, Though, Yet, If, Unless, Lest, Or, Nor, That, As, Since, Although, Therefore, Wherefore, For, But.

Q. 12. "Give instances of words spelt the same, but used in senses totally distinct, often with a change of pronunciation. Also of words pronounced alike but spelt differently, with their respective meanings." As answered by No. **22**.

§ 1.—*Prevent*, to go before; *Prevent*, to hinder. *Sow*, an animal; *Sow*, to scatter seed. *Rent* torn; *Rent*, money paid for occupying land, &c. *Ball*, a dance; *Ball*, a spherical body. *Cricket*, a game; *Cricket*, an insect. *Beetle*, a heavy mallet; *Beetle*, an insect.

§. *Hair*, of the head; *Hare*, an animal. *Air*, atmosphere; *Heir*, next inheritor. *Die*, to expire, *Dye*, to stain. *Trait*, distinguishing mark in character; *Tray*, a dish. *Tail*, of an animal; *Tale*, a story. *Vein*, an artery; *Vane*, a weathercock; *Vain*, proud, supercilious. *Seed*, germ of the future plant; *Cede*, to yield. *Veil*, an article of dress; *Vale*, a small valley. *Whale*, a fish; *Wail*, to moan. *Mete*, to measure; *Meat*, animal food; *Meet*, fitting.

SENIOR DIVISION.

Specimens of Answers to Questions set in Geography.

March 29, 1843.

Q. 1. "Give some account of the present condition of Antioch (capital of Syria), Babylon, Bethlehem, Cana, Damascus, Ephesus, Jericho, Joppa, Nazareth, Smyrna, Tadmor, Tiberias, Tyre." As given by No. **7**.

2. Babylon, on the river Euphrates, is now an extensive heap of ruins, which are all that remain of that once mighty capital.

3. Bethlehem, the birth-place of David and of Jesus Christ, was about eight miles south of the capital of Jerusalem. It is now represented by the small village of Beit-lām, half the population of which are Christians. This village has a great number of convents, and has a very picturesque appearance.

4. The small town of Cana, the place of our Saviour's first miracle, was situated a little to the north of Mount Tabor, and is now represented by a small village of the same name.

5. Damascus, which was known to the patriarch Abraham, is now, after a lapse of nearly 4000 years, the most considerable town of Syria. It is beautifully situated on the river Burada, which flows into the Bahr-el-Merg, (lake of the meadow,) and is beautifully interspersed with fine gardens and plantations, which yield the olive and mulberry in abundance. Damascus, at the present day, has a population of 110,000, who are very much engaged in manufactures; but the manufacture of sword-blades, for which this city was once celebrated, is now decayed,

Damascus is the general rendezvous for the Haj, or pilgrim caravan, from Constantinople to Mecca.

7. Jericho, which was situated in a plain to the north of the Dead Sea, and west of the Jordan, has completely gone to ruins, and nothing remains to show where it was situated.

8. Joppa, the port of Jerusalem, and situated on the sea-coast to the north-west of that city, is now represented by the small sea-port town of Jaffa.

9. Nazareth is now represented by a small village built out of the ruins of the ancient city, which are extensive.

10. Smyrna, which was one of the seven churches of Asia, is now occupied by the large and flourishing commercial town of Smyrna, which engrosses nearly the commerce of Asia Minor.

11. The ancient Tiberias was situated on the west shore of the sea of Galilee, or lake of Tiberias. The site of this town is now occupied by the small Arabic village of Tubariyeh, and the lake is also called Bahr-el-Tubariyeh.

12. Tyre, which was once the greatest commercial city in the world, and which sustained a siege of 13 years against Nebuchadnezzar, and of seven months against the efforts of Alexander the Great, is now dwindled to a small, insignificant fishing-town.

Q. 2. "Mention the chief mineral productions of Europe, with the localities where they are found." As given by No. 22.

Gold is found most abundantly in the Ural Mountains; also in the Hersynian Mountains.

Silver, most abundant in the interior of Europe, as in some of the provinces of Austria; some also in the Ural Mountains, a little in Norway and Sweden, some in the Hartz Mountains, and some little in England, in the mines of Derbyshire; a little in Ireland.

Copper, most abundant in the Ural Mountains, where it is found in great plenty; some also in Spain, and in the mines of Cornwall.

Platinum, in the Ural Mountains.

Quicksilver, most abundantly in some of the mountain chains of Spain, and in the province of Galitia in Austria.

Diamonds and *precious stones* are found in the Ural and in the Hersynian mountains.

Iron is found more abundantly in Great Britain than in any other part of Europe; some in Belgium, some in France, some little in the central plain of Russia, and a superior kind for the manufacture of steel is found in Norway and Sweden; (the *magnetic ironstone* is also found in Sweden).

Tin, most abundant in Cornwall.

Lead, in the mines of Derbyshire, some little in Norway and Sweden, some in Spain, and in the Ural Mountains.

Plumbago, or black-lead, in the Cumbrian Mountains, England.

Coal, the richest and most valuable of our productions, is found in greater plenty in Great Britain than in any other part of Europe; a little, though of an inferior kind, is also found in Ireland. Next to Great Britain, Belgium has the richest supply of this mineral; it is found in many places in France, though not nearly so abundant as with

us; in several places, though in small quantities, in the interior of Russia, and in the southern parts of Sweden a little is found.

Salt, plentiful in interior of Europe, in mines in salt-marshes, in the steppes about the Caspian Sea, in England, particularly in Cheshire.

Q. 3. "Mention the chief manufacturers of England, and the districts in which they prevail, with (if possible) some estimate of the numbers directly supported by them." As given by No. **30**.

The principal manufacture of Great Britain is the cotton, carried on chiefly in the South of Lancashire, Manchester chief place, with the surrounding places, Stockport, Oldham, Rochdale, Bury, Preston, Wigan, Blackburn, &c.

The woollen manufacture is next in importance, chiefly in the West Riding of Yorkshire. Leeds is the principal place; the surrounding places, Bradford, Halifax, Wakefield, &c. The iron manufacture is most extensive in Warwickshire, in the town of Birmingham, and surrounding places, Dudley, Wolverhampton, &c. The town of Sheffield in Yorkshire is celebrated for its cutlery. The north of Staffordshire is noted for its potteries. In the south of Wales, iron is extensively worked at Merthyr Tidville, in Glamorganshire, and other towns. Norwich, in the county of Norfolk, is noted for its manufacture of woollen stuffs. Nottingham carries on the manufacture of cotton stockings, and Kidderminster that of carpets.

Q. 4. "Give some account of the physical features and natural productions of Hindostan." As given by No. **7**.

Hindostan is bounded on the north by the Himmalaya Mountains, on the south by the Indian Ocean, on the east by the Bay of Bengal and the Birman empire, and on the west by the sea of Omān, Afghanistan, and Beloochistan.

On the north of Hindostan is the stupendous chain of the Himmalaya Mountains, some summits of which reach a height of from 20,000 to 28,000 feet. Along the east side of the Deccan run the Eastern Ghauts, on an average about 2000 or 3000 feet high. This chain is penetrated by numerous rivers.

Running along the west side of the Deccan are the Western Ghauts, between 3000 and 4000 feet in height.

The whole of the south part of India, called the Deccan, is an elevated table land, 2000 or 3000 feet in elevation.

Rivers of Hindostan.—Issuing from the south side of the Himmaleh Mountains, and flowing in a south-east direction, is the river Ganges. This stream, after receiving numerous tributaries, and flowing through many celebrated towns, falls into the Bay of Bengal through several mouths, the principal of which is the Hoogley, on which Calcutta is situated.

The Ganges is considered as very sacred by the Hindoos, and they flock to wash in its waters, generally at the junction of some other stream with it. The whole length of the Ganges is 1800 miles, and its chief tributary is the Jumna.

Issuing from lake Palti in Thibet, and breaking through the Himmaleh Mountains, is the river Indus, or Sinde; this stream, after receiving the five tributaries of the Punjaub, falls into the Arabian sea, or

sea of Omān, after a course of 2000 miles. This river often overflows its banks for a distance of 60 miles on each side, and along its banks is a salt and sandy desert.

The other rivers of Hindoostan are, Nerbuddah, flowing into the Bay of Cambay, and the Godavery, flowing across the Deccan into the Bay of Bengal, having an easterly course.

The chief productions of Hindostan are maize, and the coffee plant; and along the Coromandel coast, cinnamon, nutmegs, pepper, and other spices.

Wheat, and all kinds of fruits, are grown in abundance all over Hindostan, and on the southern declivities of the Himmaleh Mountains.

Q. 6. "Give some account of the English settlements in Africa." As given by No. **21**.

The principal English settlement in Africa is the Cape Colony, in the south, which is a fine fertile country.

Cape Coast Castle, in the Gulf of Guinea; and *Sierra Leone*, which is a very unhealthy place.

Q. 7. "What do you know of the religion, progress in civilization, and natural productions of China." As given by No. **17**.

The religion of the Chinese is that called the Buddhist. The Chinese are very averse to any change in their laws, manners, and customs; as things were a thousand years ago, so they think they ought still to remain. They have always been opposed to having their country explored by any travellers. This disposition has increased since they were conquered by the Tartars. Still, with all this prejudice, they are accounted the most civilized people in Asia. It is all very populous, which obliges them to cultivate every part like a garden.

They are chiefly employed in cultivating the mulberry for the purpose of rearing the silk-worm; also in the making of porcelain, and in preparing the tea. The great China wall is a monument of their persevering industry.

Senior Division.

Specimens of Answers to Questions set on the Globes, and in Hydrostatics and Chemistry.

March 30, 1843.

Q. 1. "Show that the latitude of a place equals the elevation of the pole star above the horizon of that place." As given by No. **2**.

Let E be the earth, and P the polar star. Then suppose Z′ to be the zenith of an observer at Z, and O′ R′ to be a continuation of the equator O R. Then the latitude of the place will be O Z, or O Z′, and the elevation of the polar star will be P B, and we have to prove ∴ that P B = O′ Z′, because O′ Z′ will contain the same number of degrees that O Z does, P B being also in degrees.

B N is the horizon of the spectator and O′ R′ that of the pole.

Then $$\frac{\text{N O}' \text{ Z}' \text{ P B}}{2} - \frac{\text{O}' \text{ Z}' \text{ P B R}'}{2},$$

or, $$\text{O}' \text{ Z}' \text{ P} = \text{Z}' \text{ P B},$$

$$\text{O}' \text{ Z}' \text{ P} - \text{Z}' \text{ P} = \text{Z}' \text{ P B} - \text{Z}' \text{ P},$$

$$\text{O}' \text{ Z}' = \text{P B} \quad \text{Q. E. D.}$$

Again, to a person at the equator, the north pole is, in the horizon, but as he advances 1°, 2°, or any number of degrees north, so the star rises 1′ 2°, or the same number of degrees in his horizon, which also proves the fact.

Q. 2. "Give an account of some of the methods by which the longitude has been ascertained in a ship." As given by No. **34**.

To find the longitude of a place at 12 o'clock you must find, by observation, when the sun is on the meridian of the place, and at that time it will be 12 o'clock, then having a time-piece regulated by London time, find the difference of time at the two places, and for every hour's difference take 15 degrees; it may also be found by knowing at what time the eclipses of Jupiter's satellites take place, and the time of the place in which they are situated; the eclipses of the satellites should be known at London time.

Q. 3. "What defines the zodiac and the tropical and polar circles in the globe respectively?" As given by No. **30**.

3. The twelve signs define the zodiac, these are classes or groups of stars into which the sun is supposed to enter monthly, answering to the twelve calendar months.

The sun is in	Aries,	♈, March 21.
	Taurus,	♉, April 19.
	Gemini,	♊, May 21.
	Cancer,	♋, June 21.
	Leo,	♌, July.
	Virgo,	♍, August.
	Libra,	♎, September 21.
	Scorpio,	♏, October.
	Sagittarius,	♐, November.
	Capricornus,	♑, December 21.
	Aquaries,	♒, January.
	Pisces,	♓, February.

The sun's highest elevation above the equator in the northern and southern hemispheres, which is on the 21st of June and on the 21st of December, $23\frac{1}{2}°$ on each side of the equator, gives the torrid zone 47°.

When the sun is in the tropic of Cancer he shines $23\frac{1}{2}°$ over the north pole, and when in the tropic of Capricorn he shines $23\frac{1}{2}°$ over the south pole, this determines the polar circles, extending $23\frac{1}{2}°$ on each side the poles.

Then taking $23\frac{1}{2}°$ the polar circle and $23\frac{1}{2}°$ half of the torrid zone from 90° the whole space between the pole and equator, gives us the temperate zone $90° - 47° = 43°$ the breadth of each temperate zone.

Q. 4. "Give a list of the planets in the order of their distances from the centre of attraction, with (if possible) some approximate estimate of their relative sizes and distances." As given by No. **4**.

Suppose the sun to be in the centre, then the relative distance of each planet from the sun are as follows:—Mercury, Venus, the Earth, Mars, Jupiter, Saturn, and Herschel or Georgium-Sidus. The sun is the largest of all the heavenly bodies, Jupiter next, Saturn next. The earth has one moon, Jupiter has four, Herschel six moons, and Saturn seven moons.

Q. 5. "Mention the chief properties of fluids, distinguishing between such as are elastic and such as are commonly styled non-elastic." As given by No. 9.

The chief properties of fluids are,—they transmit pressure, not only in that direction in which it is applied to them, as is the case with solids, or within a certain angle, as sand and some other substances, but in every possible direction; for let A, B, C, D, be any sort of a vessel filled with a fluid, water for instance, then if a force, P, be applied in any part of the vessel, it will be instantaneously transmitted to every other part of the vessel. Fluids not only transmit pressure in every direction, but EQUALLY in every direction. Fluids admit of being compressed, such as air, &c., and those which, when the compressing force is withdrawn, resume their former bulk are said to be elastic, and those which do not so non-elastic. But nature presents us with no fluid *purely non-elastic.* Air is an elastic fluid, water slightly compressible.

Fluids also rise to the same level; thus, if I pour water into the tube A, B, it will rise to the same height in the tube D, C, this follows from the circumstance that fluids press equally in all directions.

Q. 6. "Suppose a flood gate with a hinge at the top pressed against by 5 feet depth of water, the flood gate rises 5 feet out of the water; the breadth is 12 feet; find the force that must oppose the flood gate at the bottom of the water to keep it vertical." As given by No. 23.

Area gate $= 5 \times 12 = 60$

$5 \times 12 \times 5 \times 62{\cdot}5 =$ pressure, supposing it in the bottom.

$\frac{5 \times 12 \times 62{\cdot}5 \times 5}{2} =$ pressure on the side of the upright gate; this pressure acts at $\frac{1}{3}$ of the height of the water.

Let H be the hinge; from H to A is 10 feet. Let $x =$ weight. Then $x \times 10$, or H, A, must be equal to the whole pressure multiplied by the distance H, *e*.

Then $\frac{1}{3} = 1\frac{2}{3} =$ centre of pressure of the water $\therefore 10 - 1\frac{2}{3} = 8\frac{1}{3} =$ H, *e*.

$$x \times 10 = \frac{5 \times 12 \times 62{\cdot}5 \times 5}{2} \times 8\tfrac{1}{3},$$

$$x\,10 = 78125,$$

$$x = \frac{78125}{10},$$

$$x = 7812\tfrac{1}{2} \text{ lbs.}$$

Q. 7. "Find the depth to which an open rectangular vessel of oak plank, $2\frac{1}{2}$ inches thick, will sink, the outside length 30 feet, width 10 feet, and height 8 feet; and how much lading will sink it, weight of cubic foot of oak 60·5 lb." As given by No. 4.

$$30 \text{ ft.} \times 10 \text{ ft.} \times \frac{2{\cdot}5 \text{ ft.}}{12} \times 2 = \text{content of two sides,}$$

$$= 100 \text{ c. ft.}$$

$$10 \text{ ft.} - 5 \text{ in.} = 9{\cdot}583 \text{ ft.} = \text{width of end.}$$

$$9{\cdot}583 \text{ ft.} \times 8 \text{ ft.} \times \frac{2{\cdot}5 \text{ ft.}}{12} \times 2 = \text{content of ends.}$$

$$= 31{\cdot}943 \text{ c. ft.}$$

$$\left.\begin{array}{rl} \text{ft. in.} & \text{ft.} \\ 30 - 5 = & 29{\cdot}583 \\ 10 - 5 = & 9{\cdot}583 \end{array}\right\} = \text{dimensions of bottom.}$$

$$29{\cdot}583 \times 9{\cdot}583 \times \frac{2{\cdot}5}{12} = \text{content of bottom.}$$

$$= 59{\cdot}061218.$$

Then $100 + 31{\cdot}943 + 59{\cdot}061218 = 191{\cdot}004218$ c. ft. = whole content in cubic feet.

$$191{\cdot}0042 \times 60{\cdot}5 = \text{cwt. of barge.}$$

$$= 11555{\cdot}7542 \text{ lbs.}$$

Let x = depth to which it will sink.

$x \times 30 \times 10$ = content of water displaced.

$x \times 30 \times 10 \times 62{\cdot}5$ = cwt. ditto ditto.

But the cwt. of the barge is equal to the cwt. of water displaced.

$$\therefore 18750\,x = 11555{\cdot}7542 \text{ lbs.}$$

$$\therefore x = \frac{11555{\cdot}7542}{18750} = {\cdot}6163 \text{ ft.}$$

= depth to which it would sink.

Let x = the load required to sink the barge.

Then $11555{\cdot}7542$ lbs. $\times\, x = 10 \times 30 \times 8{\cdot}' \times 62{\cdot}5$

$$\therefore x = 150000 - 11555{\cdot}7542$$

$$= 138444{\cdot}2458 \text{ lbs.}$$

$$= 61{\cdot}8054 \text{ tons required to sink the barge.}$$

Q. 8. "Explain what is meant by the term 'metacentre.'" As given by No. **7**.

Suppose a body floating in water to be represented by A B D C, fig. (1), and that q is the centre of gravity of the body, and q' the centre of the displaced water. Again, suppose this body to be thrown into the position represented in fig. (2); it is then evident that the centre of gravity of the body will be in the same position as regards the body itself; but the centre of gravity of the displaced water will now be removed further to the right, or into the position q, fig. (2). Now if through q, fig. (2), we draw the perpendicular S q, cutting the axis V N at r, then r is the metacentre of the floating body. (If r cuts the axis above the centre of gravity of the body itself, the body is said to be in stable equi librium, and will return to its former position. If r cuts the axis below the centre of gravity of the floating body, it is in unstable equilibrium, and will overturn. But if r cuts the axis exactly at the centre of gravity of the body, it is in indifferent equilibrium, and will turn either way.

Q. 9. "Give some examples of chemical action that come under our notice in every day life—Distinguish between cohesion and chemical affinity." As given by No. **22**.

Lamps, or other lights, burning in a room, hydrogen unites with the oxygen of the atmosphere forming water, which may be collected by holding a bell glass over the flame; the water will be deposited in the shape of a dew.

In sourish malt liquor we often put in a little carbonate of soda;

carbonic acid is given off. We change the shape of water from a liquid to a gaseous form when we heat our water for tea.

We observe the divisibility of matter when we sweeten our tea; when we walk in the flower garden we observe the same thing in the fragrance of the flowers. We spill a drop of water on a bright steel fender, the oxygen of the water unites with the metal forming a red rust or oxide.

Cohesion is that property of matter by which particles of the same nature and kind are held together, whether in a fluid or in a solid form. *Ex.* If two pieces of finely polished steel be pressed together firmly they will adhere, and it will require some force to separate them.

Chemical affinity is that property which we observe when we unite together two or more compounds of unlike nature, when the particles of each will separate and form another compound distinct in nature and property from either of the original ones. *Ex.* If to alcohol containing dissolved camphor we add a little water, the spirit will unite with the water and leave the camphor floating on the surface; here the alcohol has a greater affinity for the water than for the camphor. Again:

: C·C *a* + ⋮ S will produce ⋮ S·C *a* + : c.

Q. 10. "What are the chief properties of the component parts of water?" As given by No. 1.

The component parts of *water* are oxygen and hydrogen. *Oxygen.* Gaseous, inodorous, transparent, colourless, uninflammable, and a great supporter of combustion. It has strong oxidizing properties, and unites with the basis of all the metals to form their oxides. It is also the greatest supporter of animal and vegetable life, for in its absence neither can exist; but, being too powerful of itself, it is mixed with nitrogen gas to form common atmospheric air.

As an illustration of its great power to support and increase combustion, may be mentioned the argand lamps and the bude lights, through the centre of whose flames is carried up a cylindrical column of oxygen, and by which means the intensity of the flame is immensely increased, as well as the original design of obtaining larger and brighter lights being fulfilled. Any thin piece of wire, also, or some iron filings, will burn in oxygen, producing beautiful scintillations; and anything in a state of combustion, being introduced in oxygen gas, will burn with great rapidity, and with an exceedingly increased and brilliant flame.

Oxygen received its name from *oxus*, (Gr.) *sour*, and *geno*, (Gr.) *to beget;* because it was formerly supposed to be the basis of all *acids.*

The chemical equivalent of oxygen is 8.

Hydrogen. Gaseous, inodorous, colourless, transparent, inflammable, but not a supporter of combustion. It is the lightest body known, being fifteen times lighter than common air; and is, on this account, employed for inflating balloons. It burns with a pale yellow flame, and, uniting with carbon, its flame is increased in brilliancy, and thus it is fitted for supplying the common gas lights, or C^2 H^2.

It has a great tendency to unite with oxygen to form water, and hence it has received the name of *hydrogen*, which is derived from *hudor*, (Gr.) *water*, and *geno*, *to beget.*

It is generally taken as the standard of the chemical equivalents, and hence its chemical equivalent is 1.

Hydrogen forms an extensive range of compounds called hydrates, and forms the chief element of most inflammable bodies.

When water is thrown upon a fierce fire, it is decomposed, the *hydrogen* ignites and the oxygen increases the brilliancy of the flame.

Q. 12. "Explain the action of Davy's lamp." As given by No. **5**.

Davy's lamp is just a common lamp surrounded by iron wire gauze; the effect of which is, that the gauze does not allow the flame to pass through, it having such a cooling influence upon the flame that it cannot pass beyond the gauze, though the smoke rises abundantly.

The superiority of this lamp above others is, that although the whole interior may be on fire, yet the fire-damp will not take fire until the gauze becomes red hot, which gives the miner time to escape.

The same. As given by No. **22**.

Davy's lamp is merely a lamp surrounded by a metallic gauze frame-work, the meshes formed of very fine wire. It is found that flame will not penetrate through this gauze-work, the metal being so good a conductor of heat; if a piece of this gauze be held over a burning stream of hydrogen gas and brought gradually on to the summit of the burning gas the flame will not penetrate it, but a portion of the gas passing through it may be ignited and will burn above the gauze-work. If, then, a lighted lamp, securely surrounded by this gauze, be plunged in to an explosive gas no damage can ensue, because the flame cannot penetrate the gauze; if the gas reach the flame of the lamp it may ignite, but cannot escape hence to the gas around it.

SENIOR DIVISION.

Specimens of Answers to Questions set in Mechanics.

March 31, 1843.

Q. 1. "Show how the centre of gravity of any number of bodies in different places may be found." As answered by No. **9**.

Suppose two bodies, A and B, not in the same (plane) T T, and their centre of gravity required; then, referring them to rectangular planes, we may, from the principles of the moments of force, find their positions as referred to the planes x, y, &c.

$$\begin{aligned} A \times Aa + B \times Bb &= (A+B)\,x \\ A \times Aa' + B \times Bb' &= (A+B)\,x' \\ A \times Aa'' + B \times Bb'' &= (A+B)\,x''; \end{aligned}$$

from which x, x', and x'' may be found.

$$x = \frac{A \times Aa + B \times Bb}{A+B},$$

$$x' = \frac{A \times Aa' + B \times Bb'}{A+B},$$

$$x'' = \frac{A \times Aa'' + B \times Bb''}{A+B}.$$

And in the same way the centre of gravity of any number is found.

Q. 2. "A B is a bar of iron 16 feet long, weighing 2 cwt., supported by a cord B C, (in length 22 feet,) and a weight of 3 cwt. suspended

at B, A C is 10 feet; find the tension of the cord." As answered by No. **22.**

$$\left.\begin{matrix}22^2-(10+x)^2=BB^2\\16^2-\quad x^2\quad=BB^2\end{matrix}\right\}$$
$$22^2-(10+x^2)=16^2-x^2$$
$$484-100-20\,x-x^2=256-x^2$$
$$384-256=20\,x$$
$$20\,x=128$$
$$x=\frac{128}{20}=6\cdot4;$$

$\therefore$ the line AB$=6\cdot4$ feet—

$$\left.\begin{matrix}10^2-\quad y^2\quad=A'A^2\\16^2-(22-y)^2=A'A^2\end{matrix}\right\}$$
$$10^2-y^2=16^2-(22-y)^2$$
$$00-y^2=256-484+44\,y-y^2$$
$$584-256=44\,y$$
$$328=44\,y$$
$$7\cdot45=y$$
$$\sqrt{CA^2-\quad y^2}=A'A$$
$$\sqrt{10^2-7\cdot45^2}=A'A$$
$$\sqrt{100-55\cdot5}=6\cdot6.$$

Suppose T$=$ tension of cord.

$$T\times AA'=W\times AB'+\text{weight bar.}\times AG$$
$$T\times6\cdot6=3\times6\cdot4+\quad2\quad\times3\cdot2$$
$$6\cdot6\,T=19\cdot2+6\cdot4$$
$$6\cdot6\,T=25\cdot6$$
$$T=\frac{25\cdot6}{6\cdot6}=3\cdot8.$$

Ans. Tension of cord $3\cdot8$ cwts.

Q. 3. "Find the weight that can be raised in 4 minutes from a depth of 90 fathoms with 3-horse power, the rope 5 inches in circumference, $\cdot046$ lb. being the weight of 1 foot of rope 1 inch in circumference." As answered by No. **10.**

Let $x=$ weight that can be raised.

Then $x\times540=$ units due to weight.

$$5^2\times\cdot046\times540=\text{weight of rope.}$$
$$5^2\times\cdot046\times540\times\frac{540}{2}=\text{units in rope;}$$
$$\therefore5^2\times\cdot046\times540\times\frac{540}{2}\times x\times540=33000\times3\times4$$
$$x\,167210=396000$$
$$x=\frac{396000}{167210}$$
$$x=2\cdot36\text{ lbs.}$$

Q. 4. "Steam at the pressure of the atmosphere rushes through an aperture 1 inch in diameter at the velocity of 2000 feet per second. Find the horse power of a wheel that would apply the whole power of this jet of steam (volume of water in steam at the pressure of the

atmosphere = $\frac{1}{1711}$th of the volume of steam.)" As answered by No. 4.

$$\frac{1^2 \times \cdot 7854}{144} = \text{area of aperture.}$$

$$\frac{1^2 \times \cdot 7854}{144} \times 2000 = \text{quantity of steam discharged per second.}$$

$$\frac{1^2 \times \cdot 7854 \times 2000}{144} \times \frac{62 \cdot 5}{1711} = \text{weight of water from which the steam is raised.}$$

$$10 \cdot 908 \times \frac{62 \cdot 5}{1711} = \cdot 398 \text{ lbs. discharged per } 1''$$

the velocity = 2000;

but $V = t \times 32$,

$$2000 = t \times 32; \quad \therefore t = \frac{2000}{32} = 62 \cdot 5;$$

but space $= t^2 \times 16$;

$\therefore s = (62 \cdot 5)^2 \times 16 = 62500 =$ the space passed over before acquiring a velocity of 2000.

Then $62500 \times \cdot 398 =$ units of work done by the steam in $1'' = 24875$.

$24875 \times 60 =$ units done in 1 minute;

$$\frac{1492500}{33000} = 45 \cdot 22 = \text{horse power.}$$

Q. 5. "The diameter of the cylinder of a steam engine is 80 inches, the piston makes 8 strokes of 10 feet per minute, the mean pressure on the piston 15 lb. per square inch. Find the horse power. Find also how many cubic feet of water it will raise per minute from a depth of 112 feet." As answered by No 3.

$80^2 \times \cdot 7854 = 5026 \cdot 56 =$ area of piston;

$80^2 \times \cdot 7854 \times 15 = 75398 \cdot 4 =$ press on piston;

$80^2 \times \cdot 7854 \times 15 \times 10 \times 8 = 6031872 =$ units of work.

$$\frac{6031872}{33000} = 182 \cdot 7 = \text{horse power.}$$

Let $x =$ number of cubic feet of water; then

$$\frac{x \times 62 \cdot 5 \times 112}{33000} = 182 \cdot 7$$

$$7000x = 182 \cdot 7 \times 33000$$

$$x = \frac{6031872}{7000};$$

$\therefore x = 861 \cdot 8$ cubic feet.

Q. 6. "20,000 cubic feet of earth are to be carried in waggons 2 miles on a level road, the friction $\frac{1}{30}$; each cubic foot weighs 200 lbs; each waggon contains 3 cubic yards, and weighs $\frac{1}{4}$th of its net load. The traction of each horse is 160 lbs., and they travel when loaded at $2\frac{1}{2}$ miles per hour, and when unloaded at 4 miles per hour, working 6 hours daily. How many horses must be put in each waggon. And how many waggons will do the work in 3 days." As answered by No. 7.

3 cubic yards $= 27 \times 3$ feet $= 81$ cubic feet.

Weight of net load $= 81 \times 200 = 16{,}200$ lbs.

Weight of waggon $= \frac{16200}{4} = 4{\cdot}050$.

Gross load $= 16200 + 4050 = 20{,}250$ lbs.

$\frac{20{\cdot}250}{30} = 675 =$ whole traction.

$\frac{675}{160} = 4{\cdot}21875 =$ number of horses required.

Number of waggons of earth to be taken,

$$= \frac{20{,}000 \times 200}{81 \times 200} = \frac{20{,}000}{81}$$

$\frac{2}{2\frac{1}{2}} = \frac{4}{5}$ hours in going with the loaded waggon.

$\frac{2}{4} = \frac{1}{2}$ hour in returning.

Whole time that one waggon would take to do all the work,

$$= \left(\frac{4}{5} + \frac{1}{2}\right) \times \frac{20{,}000}{81}$$

$$= \frac{13}{10} \times \frac{20{,}000}{81} = \frac{26{,}000}{\cdot 81} \text{ hours.}$$

3 days $= 3 \times 6$ hours $= 18$ hours.

$$18 \text{ hours} : \frac{26{,}000 \text{ hours}}{81} : : 1 \text{ waggon}$$

$$1458 : 26{,}000 : : 1 \text{ waggon} : 17{\cdot}832 \text{ waggon.}$$

Ans. 17·832 waggons.

Q. 7. "The main section of a stream is 5 feet by $1\frac{1}{2}$, and the mean velocity of the water 11 feet per minute. There is a fall of 13 feet on this stream; what is the horse power of a wheel erected on it that will yield ·65 of the work done." As answered by No. 6.

$$\frac{5 \times 1\frac{1}{2} \times 11 \times 62{\cdot}5 \times 13 \times {\cdot}65}{33{,}000} \text{ lbs.} =$$

horse power $= 1{\cdot}32$.

Q. 8. "The wheel in the last example is employed to raise a portion of the water of the stream to a vertical height of 150 feet above its higher level. How many cubic feet will it raise per minute (1). When it is taken from the upper level of the stream. (2). When taken from the lower level. Which arrangement involves the smallest expenditure of power." As answered by No. 7.

From the lower level. Whole height to which it is raised $= 150 + 13 = 163$ feet.

Put $x =$ quantity raised; then

$$43570{\cdot}31 = x \times 62{\cdot}5 \times 163;$$

$$\therefore x = \frac{43570{\cdot}31}{62{\cdot}5 \times 163} = 4{\cdot}276 \text{ cubic feet.}$$

Put $y =$ quantity raised from the higher level.

Then $(5 \times 1\frac{1}{2} \times 11 - y) =$ quantity that falls on the wheel.

$$(5 \times 1\tfrac{1}{2} \times 11 - y) \times 62{\cdot}5 \times 13 \times {\cdot}65 = 7 \times 150 \times 62{\cdot}5$$

$$43570 \cdot 31 - 528 \cdot 1257 = 1507 \times 62 \cdot 5$$
$$9375\,y + 528 \cdot 125\,y = 43570 \cdot 31$$
$$y = \frac{43570 \cdot 31}{9903 \cdot 125} = 4 \cdot 399 \text{ cubic feet.}$$

There is more water raised from the top than from the bottom, and there is not so much power expended when raised from the top.

JUNIOR DIVISION.

Specimens of Answers to Questions set in Grammar and English History.

March 24, 1843.

Q. 1. "Define the noun, pronoun, and verb." As answered by No. **38.**

A noun is the name of anything perceived by the senses, or conceived in the mind; as light, property, nothing, &c.

A pronoun is a word in place of a noun, to keep up the application of the noun to other parts of a sentence; as, I saw *John*, and *he* gave me the book.

A verb is a word which bids or asserts, or expresses being, doing, or experiencing; as, *Go* to the door. I *am doing* all that I *can*. I *felt* great pain.

Q. 2. "Parse the sentence, 'Tell me how many parts of speech there are.'" As answered by No. **26.**

Tell, act. verb, imp. mood, 2nd pers., sing. or plu., agreeing with its nom. *thou* or *you* understood. *Me*, pers. pron., 3rd pers., sing., obj., governed by the prep. *to* understood. *How*, adverb. *Many*, numerical adj. *Parts*, noun, 3rd pers., sing., nom. to *are*. *Of*, prep. governing *speech*. *Speech*, noun, neut., sing., obj., governed by *of*. *There*, adverb. *Are*, auxil. verb, ind. mood, pres. tense, 3rd pers., plur., agreeing with its nom. *parts*.

Q. 3. "Give instances of verbs forming their perfect tenses irregularly." As answered by No. **37.**

Arise, arose; Am, was; Beget, begat; Behold, beheld; Come, came; Catch, caught; Do, did; Forget, forgot; Go, went; Have, had; Seek, sought; Take, took.

Q. 4. "From what Latin or Greek root does the latter part of excuse, parallel, seclude, come? Give some English words in which the same root occurs." As answered by No. **39.**

The latter part of *excuse* comes from the Lat. *causa*, a cause; of *parallel*, from *allelon*, each other; of *seclude*, from *claudo*, to shut.

From *causa* also comes *cause*, reason; *because*, for this cause.

From *allelon* comes *parallelogram*, a figure whose opposite sides are parallel.

From *claudo* comes *seclusion*, the act of keeping one's self private; *exclusion*, the act of shutting out; *include*, to shut in; *exclude*, to shut out.

Q. 5. "Frame a sentence containing a pronoun, adverb, preposition, and conjunction." As answered by No. **42.**

Our knowledge is *greatly* improved *by* reading *and* meditation,

Q. 6. "Distinguish between transitive and intransitive verbs." As answered by No. **35**.

A transitive verb is that which expresses an action passing from the actor to an object; as, He *killed* the king. An intransitive verb is that which expresses a state of being, or an action confined to the actor; as, He *sits*; he *sleeps*.

Q. 7. "Give the dates of the Norman conquest—the accession of King John—the death of Henry V.—and the marriage of Henry VIII. with Anne Bullen." As answered by No. **32**.

Norman conquest, 1066; Accession of John, about 1200; Death of Henry V., 1422; Marriage of Henry VIII., 1509.

Q. 8. "How was Stephen connected with the Royal Family of England." As answered by No. **33**.

Stephen was son of the *Count de Blois;* his father married the daughter of *William the Conqueror*. He was engaged in unceasing struggles with Matilda. At one time Matilda took Stephen prisoner, and had herself crowned; but not being able to quell the turbulent multitude, Stephen was released and crowned king, but soon died, and Henry II. succeeded him.

Q. 9. "Distinguish between the kings of the Houses of York and Lancaster. With whom and how did the struggle terminate." As answered by No. **40**.

Edward III. had several sons,—Edward the Black Prince, the Duke of York, and the Duke of Lancaster. Richard II., son of Edward the Black Prince, succeeded him; he banished Henry Bolingbroke, son of John of Gaunt, Duke of Lancaster. Bolingbroke, on his father's death, returned to assume his dignity and property (which latter had been confiscated or plundered by the king), and was induced to depose Richard, who was murdered in Berkely Castle.

Henry IV. was the first of the House of Lancaster. Henry V., his son, succeeded. Henry VI., his son, succeeded; in whose reign the wars of the red and white roses desolated the country, and the Yorkists became triumphant. Edward IV., the first of the House of York, succeeded him.

Edward V., his infant son, succeeded him; he was murdered by Richard III., brother of Edward IV., and son of Richard Plantagenet, Duke of York. He usurped the throne. Then the final battle of Bosworth-field was fought; Richard was killed, and Henry Earl of Richmond (Henry VII) succeeded. He married Elizabeth, daughter of Edward IV.; and thus were the houses of York and Lancaster united, and the civil wars ended.

Q. 10, § 1. "In whose reigns did Thomas à Becket, Wycliffe and Cardinal Wolsey respectively die? Give some account of these." As answered by No. **39**.

Thomas à Becket died in the reign of Henry II.

In the time of Henry II. the power of the Popish clergy was very great, and Henry wished to control it. In order to this, he appointed Thomas à Becket, the high chancellor, and a great friend of the king, ot the dignity of Archbishop of Canterbury, thinking thereby to bring about his designs. He was mistaken, however; for, as soon as Becket had

obtained this important office, he made use of his power against the king, and became so obstinate, that Henry banished him from the kingdom. This drew Henry into a quarrel with the Pope, who threatened him with excommunication unless he recalled Becket. Henry then permitted him to return; but he was so ungovernable, tha tthe king once expressed his surprise that none of his friends freed him from this turbulent priest. Upon this, some of his attendants hastened to Canterbury, and slew the Archbishop at the foot of the altar. He was afterwards canonized, and Henry did penance for the crime.

Q. 10, § 2. "Give some account of Wycliffe. In whose reign did he die." As answered by No. **31**.

Wycliffe died in the reign of Richard II. He was a star which shone with considerable brightness in that dark age of superstition and unbelief. He translated the Bible into the vulgar tongue, and had a considerable body of followers, who were denominated Lollards. He may justly be styled the morning star of the Reformation.

Q. 10, § 3. "Give some account of Cardinal Wolsey. In whose reign did he die." As answered by No. **31**.

Cardinal Wolsey is said to have been the son of a butcher of Ipswich. He was possessed of first-rate abilities, and all those qualities which suit a man of great ambition. Being introduced at court, he was early taken notice of by Henry VIII., who eventually raised him to the rank of Archbishop of York and chief minister of the country. In these offices he amassed an immense amount of riches; and the noblest and greatest of the land were not ashamed to appear in his train. He ministered to the passions and pleasures of the king in every respect. He was created Cardinal by the Pope, and even expected, through the influence of the King of Spain, to have been raised to the papacy; but in this he was disappointed. The fickle monarch, growing tired of his minister, ordered him to be arrested, and his goods, plate, &c. to be seized; and he himself to appear in London toanswer the charges brought against him. He was taken ill and died on the road to London, declaring with his last breath, "If I had served my God as I have served my king, he would not have forsaken me in my old age."

Q. 11. "Give some account of the struggles between England and Scotland." As answered by No. **29**.

The cause of the war between England and Scotland was the dispute about the right of succession, which was claimed by several parties. The principal was that of Bruce and Baliol. The dispute was referred to the English king, Edward I., and he accordingly decided in favour of Baliol, being a person whom he could keep under easily. Baliol was accordingly crowned king; but, refusing to comply with Edward, who summoned him to London, he came and made him prisoner. Edward had it all his own way till the rising of the Scots under Sir William Wallace, a patriotic nobleman of determined bravery and illustrious birth. He made great resistance, but was many times defeated, and at last betrayed to the English by one John Montford. Edward had Wallace beheaded and quartered as a traitor to a king he had never acknowledged. The next who rose for the protection of Scotland was Robert Bruce, grandson of Bruce the competitor of Baliol. Edward

therefore marched against him, but was taken ill and died at Carlisle. With his dying breath he commissioned his son, Edward II., to subdue the Scots. He (Edward II.) met Bruce, who had only 30,000 men to 100,000; then was fought the famous battle of Bannockburn, in which Edward was completely defeated, and escaped with his life, being hotly pursued by Douglas and Randolph. Here ended the war during the reign of Edward II. But in his son's (Edward III.), while he was in France, David Bruce invaded England, but was met and defeated at Neville's-cross by Philippa, Edward's queen. After this a long struggle continued; the most famous battle being that of Flodden-field. The two kingdoms were finally united by James I. of England and VI. of Scotland, in right of his mother, Mary Queen of Scots, who had been beheaded by Elizabeth; and with him commenced the line of the Stuarts in England.

JUNIOR DIVISION.

Specimens of Answers to Questions set on the Globes; and in Mensuration.

March 30, 1843.

Q. 1. "Give arguments showing that the earth is round." As answered by No. **31.**

When an observer stations himself on the sea-shore to observe the vessels approaching the land, he sees first, the top mast, next the sails, and last of all the hull. If the earth were a plain, he would see the whole of the vessel *at once*, as soon as it came within the range of vision. Again: if the earth were a plain, the sun would circle round and round, instead of appearing to rise and set. And again: there is no body which will cast a circular shadow in all situations but a sphere; and it is observed, that the shadow which the earth projects on the moon is *always* circular.

The earth has also been circumnavigated; and lastly, when a traveller moves in a northern or southerly direction, he can see a great number of stars, in either case, that he could not see before. All these arguments, taken severally and conjointly, go to prove the rotundity of the earth.

Q. 2. "What is meant by the Ecliptic? the latitude of a place, its longitude? How are these latter determined." As answered by No. **20.**

The ecliptic is a line upon the globe, which is intended to represent the annual path of the sun (*id est*, its apparent path) in the heavens: it crosses the equator obliquely, and extends 23½° to the tropic of Cancer; then, returning at the same angle across the equator, extends 23½° south of the tropic of Capricorn.

The latitude of a place is its distance north or south of the equator. The longitude of a place is its distance east or west of any given meridian. (British sailors reckon their longitude 180° east and west from the meridian of Greenwich). In the northern hemisphere, latitude is determined by taking the elevation of the Polar star; or, in either hemisphere, by taking the sun's meridian altitude, and subtracting it from 90°, adding the declination of the sun from the equator, if the sun and the observer are both in the northern hemisphere, but subtracting it when

the sun has a southern declination. The operation is the same in the southern hemisphere: take the meridian altitude, subtract that from 90°; if the sun is at the equator, the altitude from 90° gives the south latitude: if the sun has a southern declination, add this declination to the subtrahend already found; or subtract it if the sun has a northern declination. The longitude of a place is determined by observing the moment when the sun is at its meridian to the observer, and comparing it with a chronometer set to the time at Greenwich. If the chronometer should be 1 o'clock, for instance, it would show that the sun had passed the meridian Greenwich one hour, and the longitude would be 15° west. If the chronometer was 11 o'clock, it would show that the sun would be yet an hour before it passed the meridian of Greenwich, and that therefore we are in east longitude 15°, reckoning a degree for every four minutes difference in time.

Q. 4. "Explain the phenomenon of an eclipse of the moon." As answered by No. **31**.

The moon being an attendant satellite on the earth, revolves around it in a plane *nearly* parallel to the orbit of the earth. But she makes the circuit of her orbit in much less time than the earth; if this were not the case, there would be an eclipse, providing she moved in the plane of the same orbit every time she arrived at her greatest distance from the sun; but this is not the case,—an eclipse happens only when the moon arrives at her greatest distance from the sun, and when she is in the same right line as the earth. The earth being so much larger, consequently hides the light of the sun from the moon, and causes the phenomenon of an eclipse.

Q. 5. "Is there most twilight at the Equator or at the Poles? Give the reasons." As answered by No. **12**.

There is less twilight at the equator than at other places, on account of the more perpendicular descent and ascent of the sun when she rises or sets.

Q. 6. "What causes the change of seasons." As answered by No. **35**.

The change of seasons is caused by the earth's axis being continually preserved at the same angle to the plane of its orbit, and thus presenting, in its revolution round the sun, different parts of its surface to that luminary. By reference to the figure, it will be evident that when the earth is at A, the north part will be illuminated by the sun's rays, while the south is deprived of them. When the earth is at C, just the reverse will be the case.

Q. 7. "How many cubic yards in a cutting, where the heights at every 2 chains are 0, 3, 5, 7·5, 8, 9·5, 8, 6, 4, 0., the width of the line 33 feet and the slopes 2 to 1." As answered by No. **16**.

Professor Moseley's Formula.

1st Process.

$$\frac{6\times 33}{2}\{3+5+7\cdot5+8+9\cdot5+8+6+4\}=5049$$

2d Process.

$$4\{3^2+5^2+7^2\cdot5^2+8^2+9^2\cdot5^2+8^2+6^2+4^2\}=1442,$$

3d Process.

$$2\{3\times5+5\times7\cdot5+7\cdot5\times8+8\times9\cdot5+9\cdot5+8\times6+6\times4\}=673.$$

4th Process.

$$\text{Solid content} = 2 \text{ chains } \frac{132\times2}{6}\{5049\times1442\times673\}=31526.$$

$$\text{Solidity of railway cutting in cubic feet} = \frac{315216}{27}=11674\tfrac{8}{3} \text{ yards.}$$

Q. 8. "Find the area of a room 75 feet 9 inches, by 17 feet 7 inches." As answered by No. **36.**

	75	9	
	17	7	
1287	9		
44	2	3	
Ans. 1331	11	3	

Q. 9. "How many square feet in a triangle whose sides are 13, 14, and 15 feet?" As answered by No. **13.**

13			
14			
15			
2)42	21	21	21
	13	14	15

$21\times8\times7\times6=\sqrt{7056}=84$ square feet *Ans.*

Q. 10. "Find the hypothenuse of a right angled triangle, the sides being 10 and 14 feet." As answered by No. **26.**

$10^2+14^2=\sqrt{2\cdot96}$ (17·204650534

1

27) 196
189

342) ·700
684

34404) ·160000
137616

22384

Ans. 17·204650534 feet.

Q. 11. "Find the area of a trapezium, the diagonal being 108 feet 6 inches; and the perpendiculars on it 56 feet 3 inches and 60 feet 9 inches respectively." As answered by No. **20.**

$$\frac{108\cdot6\times56\cdot3+108\cdot6\times60\cdot9}{2}=3295\ 8\ 3+3051\ 6\ 9=6347\ 3.$$

Ans. 6347 3.

Q 12. "Taking the circumference of the earth at 25,000 miles, what is its diameter?" As answered by No. **39.**

3·1416)25000
31416) 250000000·000 (7957·7
219912
300880
282744
× 181360
157080
242800
219912
228880
219912
8968

7957·7 miles. *Ans.*

Q. 13. "Find the cost of roofing a house at 11*s.* per square, the length within the walls being 50 feet 9 inches and the breadth 30 feet; height of roof one-third the width." As answered by No. **32.**

Feet.

18·02 × 50·75 = Area ABCD = 914·515
914·515 × 2 = Area A B C D C′ D′ = 1829·03
$\frac{1829·03}{100}$ = Number of Squares = 18·2903
18·2903 × 11 = £10. 1*s.* 2½*d.* ·2784.

Ans. £10. 1*s.* 2½*d.* ·2784.

Q. 14. "Find the content of a cone, the circumference of base 9 feet, height 10½ feet." As answered by No. **37.**

Diameter.
3·1416)9 (2·864
62832
271680
251328
·203520
188496
·150240
125664
·24576

Feet.
2·864
2 864
11456
17184
22912
5728
8·202496
·7854
32809984
41012480
65619968
57417472
6·4422403584
10.5

3221120179 20
64422403584

3)67·64352376320

22·5478412544

Ans. 22·5. cubic feet.

JUNIOR DIVISION.

Specimens of Answers to Questions set in Mechanics.

March 31, 1843.

Q. 1. "Classify under the different sorts of levers the action of crowbars, doors on their hinges, extraction of a nail by a cleft hammer handspikes, muscles of the limbs of animals, nutcrackers, oars, pincers, poker, rearing a ladder, scissors, snuffers, steel yard, tongs, tweezers." As answered by No. **35**.

First kind of Levers.

Extraction of a nail by a cleft hammer, pincers, pokers, scissors, snuffers, steelyard.

Second kind of Levers.

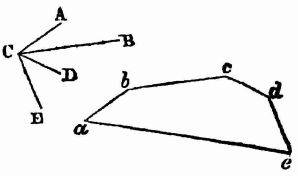
Crowbars, doors, handspike, nutcrackers, oars.

Third kind of Levers.

Muscles of the limbs of animals, raising a ladder, tongs, tweezers.

Q. 2. "Given the direction and proportion of any number of forces, acting on a body, to each other; show how the direction and proportion of the resultant may be found." As answered by No. **42**.

Suppose AC, BC, DC, and EC to represent the direction and magnitude of the given forces; then if we draw the polygon *a*, *b*, *c*, *d*, *e*, making *ab* equal and parallel to CA, *bc* equal and parallel to CB, *cd* equal and parallel to CD, and *de* equal and parallel to CE, then will *ea* represent the direction and magnitude of the resultant, therefore from C we draw the resultant CF equal and parallel to *ea*.



Q. 3. "Explain how wheels of large diameter lighten the labour of horses in drawing." As answered by No. **42**.

The resistance horses, in drawing, have to overcome is the friction on the axis of the wheel; the wheel serves as a lever, the fulcrum of which is the point of the wheel that is in contact with the ground; the power is applied at the centre of the wheel, and the resistance at the circumference of the axis, therefore, in the same proportion that the diameter of the wheel increases to the diameter of the axis, will the power required to overcome the resistance decrease to the resistance.

Q. 4. "Find the proportion of the power to the weight in the annexed system of pullies." As answered by No. **20**.

Suppose W to be a weight of 27 lbs., then this weight is supported by

three cords, each of them supporting $\frac{1}{3}$ of the weight; as it is one continuous cord it will have the same tension throughout, therefore 9 lbs. will be supported by N; now this in like manner is supported by three cords, consequently each cord will support $\frac{1}{3}$ of 9 lbs., or 3 lbs.; therefore O will have to support 3 lbs.; O is supported by 3 cords, as before, each will sustain $\frac{1}{3}$ of 3 lbs. or 1 lb.; this being one continuous cord will have the same tension or stretch, so that 1 lb. at P will support 27 lbs at W.

Q. 5. "How many cubic feet of water will an engine of 20-horse power pump in 20 hours from the bottom of a shaft of 200 fathoms." As answered by No. **26**.

fath. lbs. ft.
$200 \times 62{\cdot}5 \times 6 = 7500$ units to raise 1 cubic foot.
H.P. hrs. m.
$33000 \times 20 \times 20 \times 60 = 792000000$ what the engine does.

$\frac{792000000}{75000} = 10560$ cubic feet water pumped in the course of 20 hours. *Ans.*

Q. 6. "Find the units of work done by a horse in drawing a ton on a level road two miles in length, the friction $\frac{1}{30}$th of the load." As answered by No. **32**.

$$\text{Friction} = \frac{1 \times 20 \times 112}{30} = \frac{224}{3} = 74\tfrac{2}{3}$$

$$\text{Units} = 74\tfrac{2}{3} \times 2 \times 1760 \times 3 = 788480. \quad \textit{Ans.}$$

Q. 7. "Find the units of work in raising a brick wall 50 feet long, 2 feet broad, and 20 feet high, the weight being 150 lbs. per cubic foot." As answered by No. **28**.

Weight of wall in lbs. $= 50 \times 2 \times 20 \times 150 = 300000$ lbs., then if the wall be of equal thickness in every part we may conceive it all to have been raised to its centre of gravity or middle point which is $\frac{20}{2} = 10$ ft. from the bottom, therefore $300000 \times 10 = 3000000 =$ units of work in raising the wall.

Q. 8. "A train of 30 tons comes down an incline of 1 in 480 at 16 miles per hour. Find the horse power of the engine. Friction 8 lb to the ton." By No. **39**.

Units of work due to friction $= 30 \times 8 \times 16 \times 5280 = 20275200.$
Units of work due to gravity $= 30 \times 2240 \times \frac{1}{30} \times 5280 = 11827200.$

$$\therefore \text{H.P.} = \frac{20275200 - 11827200}{33000 \times 60} = 4{\cdot}26' \textit{ Ans.}$$

Q. 9. "A person at the top of a tower drops a stone which falls to the ground in $2\frac{1}{4}$ seconds. Find the height of the tower." As answered by No. **12**.

$s = t^2 \times 16$
$s = 2\frac{1}{4}^2 \times 16$
$s = 5\frac{1}{16} \times 16 = 81$ ft. *Ans.*

Q. 10. "The mean section of a stream is 5 feet by $1\frac{1}{2}$ feet, the mean velocity 11 feet per minute. A wheel being erected on a fall of 13

feet; find the horse power of the wheel, supposing it to yield ·65 of the work of the water." As answered by No. **29**.

$$5 \times 1\tfrac{1}{2} \times 11 \times 13 \times 62 \cdot 5 \times \cdot 65 = 43610 \cdot 9395 \text{ units done.}$$

$$\text{Number of H.P.} = \frac{43610 \cdot 9395}{33000} = 1 \cdot 3215 \textit{ Ans.}$$

Q. 11. "A locomotive engine ascends an incline of 1 in 300 at the rate of 16 miles per hour with a gross load of 60 tons. Find the horse power of the engine. Friction 8 lbs. to the ton." As answered by No. **41**.

Resistance of friction $= 60 \times 8 = 480$ lbs.
Distance in 1 hour $= 16 \times 5280 = 84480$ ft.
Units due to friction $= 480 \times 84480 = 40550400$.
Resistance of weight $= 60 \times 20 \times 112 = 134400$ lbs.

$$\text{Perpendicular height} = \frac{16}{300} \times 5280 = 281 \cdot 6.$$

Units due to gravity $= 134400 + 281 \cdot 6 = 37847040$.
Total units of work per hour $= 40550400 \times 37847040 = 78397440$.

$$\text{H. P.} = \frac{78397440}{60 \times 33000} = 39 \cdot 5946' \textit{ Ans.}$$

Q. 12. "20,000 cubic feet of earth weighing 100lb. per cubic foot are to be excavated and conveyed in barrows a horizontal distance of 360 feet. The shovellers throw out 350 cubic feet per day, and three pickmen are required to two shovellers. How many shovellers, pickmen, and barrowmen will be required to complete the excavation in three days."

"Also find the cost of wages of pickmen (15*s.* per week and those of the shoveller and barrowmen 13*s.*). Relays of barrows at 120 feet distance, and the barrow holding a cubic foot." As answered by No. **37**.

$$\text{Number of shovellers for 3 days} = \frac{20000}{350 \times 3} = 19 \cdot 047.$$

$$\text{Number of relays} = \frac{360}{120} = 3.$$

Number of barrowmen for 3 days $= 19 \cdot 047 \times 3 = 57 \cdot 141$.

$$\text{Number of pickmen for 3 days} = \frac{19 \cdot 047 \times 3}{2} = 28 \cdot 57.$$

$$\text{Cost of shovellers and barrowmen} = \frac{19 \times 57 \times 13}{2 \times 20} = £24\ 14\ 0$$

$$\text{Cost of Pickmen} = \frac{28 \times 15}{2 \times 20} = 10\ 10\ 0$$

£35 4 0

Ans. The number of shovellers 19·047.
barrowmen 57·141.
pickmen 28·57.
And the cost of excavation £35 4 0

JUNIOR DIVISION.

Specimens of Answers to Questions set in Geography.

March 29, 1843.

Answer to Q. 1. "Describe the chief physical features of Palestine."

As given by No. 40.

The surface of Palestine is undulating, and of a generally hilly character; in the north mountainous; in the middle, fertile hills wooded to their summits; in the south rugged, black, naked, and rocky hills.

In the north of the country are two ranges of Mountains—Libanus and Anti-libanus, parallel to each other, and nearly so to the coast of the Mediterranean. That nearest the sea is Lebanon, which decreases in height, and terminates its southward extension at the coast, near Tyre; the other range, Anti-lebanon, extends southward as far as Mount Hermon (the highest mountain in Palestine, being 11,000 feet high—nearly the line of perpetual snow in that latitude); then the range divides into two on either side of the Jordan, and extends throughout the whole country, more or less broken and divaricated in the south; they again assume a regular form in two parallel chains to the south of the Dead Sea, extending south-westerly to the eastern arm of the Red Sea. (This chain is called Seir, the highest summit of which is Mount Hor, upon which Aaron died.) A farther extension of these mountains, between the Elanitic and Heeropolitic Gulfs of the Red Sea, forms the peninsula of Sinai, the principal summits of which are Horeb and Sinai, from the top of which the appearance of the surrounding scenery is of the wildest description. Mount Carmel, the scene of Elijah's sacrifice, forms the only promontory of any consequence on the coast, and is the termination of a chain of hills which run in a north-westerly direction; Mount Tabor, an isolated conical hill in the north of the great plain of Esdrælon, the supposed scene of our Saviour's Transfiguration; south of this, Little Hermon; south of this the Mountains of Gilboa; still farther south, the Mounts Ebal and Gerizim, with the valley of Gerizim between them; near the Jordan, on the north of the Dead Sea, the Mountains of Quarantania, the supposed scene of the (forty days) Temptation; and beyond the Jordan, the Mountains of Gilead, which are hills spreading over the greater part,—Mount Gilead, one of the principal, being now called Jelaad.

A plain extends all along the coast between the hills and the sea, wide near the Bay of Acre, and where it forms the Plain of Sharon. Another plain extends all along the course of the Jordan, between the two opposite ranges of hills; this is widest near Jericho, and is called the Plain of Jericho at this part. A continuation of this plain extends all the way between the parallel ranges to the head of the Elanitic Gulf of the Red Sea.

Of other plains, that of Esdrælon or Jezreel is the largest and is the most beautiful in the whole of Palestine, extending from Mount Carmel on the west, Mount Tabor on the north, and the mountains of Gilboa on the south, to the hills which divide it from the Sea of Galilee; then to the east of the Jordan is the large plain of the Hauran, covered in the present day with the remains of ruined villages, roads, aqueducts, theatres, &c., attesting its former grandeur and population, but without

a single inhabitant, save the wandering Arab who may pitch his tent there.

Lakes and Rivers.—The principal river is the Jordan, which rises near Banias (the ancient Cæsarea Philippi), and flows through the Waters of Merom (a small lake four miles long), and through the Lake of Tiberias (or Sea of Galilee, Sea of Chinnereth, Lake of Gennesaret—a beautiful lake about fifteen miles long and seven broad, and of beautiful fresh water filled with plenty of fish), along what is called the Valley of the Jordan, into the Salt or Dead Sea (Lake Asphaltites, Sea of Sodom, Sea of the Plain). The waters of the Jordan are very sweet and beautiful: the waters of the Dead Sea are very salt and buoyant,—their specific gravity, as compared with rain-water, 1·211, and containing a quarter of their weight in salt.

The other rivers are of smaller importance. The only perennial streams which flow into the Mediterranean are the Leontes or Waters of Merom, and "that ancient river" the river Kishon; the Kanah and Besor are brooks or winter torrents, dry in summer, but in winter impetuous. Flowing into the Jordan on the west side are none but brooks, as the brook Cherith, &c.; but on the eastern side, besides brooks, are three perennial streams—the Hieromax, south of the Sea of Galilee; the Jabbok, in the middle of its course; and the Arnon, near the Dead Sea.

From the indolence of the inhabitants, the country is not so fertile as formerly, but there are remains of terrace-gardening which show the former industry of the inhabitants: it is even now a land of corn, and wine, and oil. The hills serve for pasturage, and the valleys are filled with the different vegetable productions, especially in the northern and more fertile districts.

It is bounded on the north by the Mountains of Lebanon and Antilebanon, which divide it from Syria; and on the east and south by deserts (not entirely barren); on the west by the Mediterranean or Great Sea.

Answer to Q. 3. "Classify the rivers of Europe according to their lengths, and the seas into which they fall." As given by No. 40.

The Volga falls into the Caspian Sea.
The Danube into the Black Sea.
The Don into the Sea of Azoph.
The Dnieper and Dniester into the Black Sea.
The Rhine into the German Ocean.
The Vistula, which falls into the Baltic.
The Oder, ditto.
The Weser and Elbe into the German Ocean.
The Tagus into the Atlantic.

Besides these, which are nearly in the order of their length, are
The Seine, which falls into the English Channel.
The Loire and Garonne into the Bay of Biscay.
The Rhone into the Gulf of Lyons.
And the Minho, Douro, Guadiana, and Guadalquiver into the Atlantic; the Ebro into the Mediterranean.
The Po into the Adriatic.
The Tiber into the Mediterranean.

The Northern Dwina into the White Sea.
The Southern Dwina into the Gulf of Riga.
The Neva into the Gulf of Finland.
The Dahl and Goeta into the Baltic.
The Memel into the Baltic.
The Meuse and Moselle, tributaries of the Rhine.
The Scheldt into the German Ocean.
The Thames and Humber into the German Ocean. The Severn into the Bristol Channel. The Mersey into the Irish Sea; and the Shannon into the Atlantic. The Clyde into the Atlantic; and the Forth into the North Sea.

Answer to Q. 4. "Describe the natural productions and physical features of Spain and Portugal." As given by No. **12.**

Spain and Portugal are bounded on the north by the Pyrenees, on the south by the Mediterranean Sea, on the east by the Mediterranean Sea, and on the west by the Atlantic Ocean. Spain in its central part is a table-land. Spain is traversed by mountains, which run from east to west. On the north are the Pyrenees, in the interior are the Castilian and Sierra Morena Mountains, and most south are the Sierra Nevada Mountains. The Sierra Morena are particularly rich in minerals, especially quicksilver and lead. Spain and Portugal are not abundant in lakes, but have numerous rivers. The principal rivers of Spain are the Minho, Tagus, Guadiana, Guadalquiver, and Ebro. Spain and Portugal are particularly fertile, yet this is not taken advantage of by the natives, who, for the most part, are indolent, and lamentably ignorant. In the north part of Spain fruits of a hardier kind, such as our own, are chiefly grown; in the middling parts pasturage is the most general pursuit, where a great number of sheep are kept, and great quantities of wool are exported; but in the south part of Spain, and nearly the whole of Portugal, the vine cultivation only is generally pursued. The south part is particularly adapted for this. The climate of the south part is very warm; but in the midland elevated parts the climate is much colder.

Answer to Q. 6. "What is known of the interior of Africa? Is any commerce carried on with it?" As given by No. **24.**

A great part of the interior of Africa is totally unknown, and those parts which are known are chiefly deserts. The Sahara, or Great Desert, is a large tract of land, nearly the whole of which is desert. In the interior of this desert there are oases, or fertile spots, which have a beautiful appearance when contrasted with the wide desert. Here the traveller can sit and refresh himself with water after travelling over the parched desert. The central part of Africa, about Lake Chad, is very fertile; but the interior of South Africa is entirely unknown.

There is commerce carried on in Africa by means of caravans, which cross the desert, and fetch from the interior gold, &c., and take with them manufactured goods and provisions from the exterior. The beast made use of is the camel, as no other kind will do, owing to the nature of the country.

Answer to Q. 7. "Give a sketch of the chief facts connected with the physical geography of the world." As given by No. **31.**

The first thing which we are led to notice on a map of the world is

the great extent of water compared with the land. The whole mass of water covers *nearly* three-fourths of the surface of the globe, the land occupying the remainder. The two great bodies of water, the Pacific and the Atlantic, stretch from north to south, and contain about three and a half per cent. of salt; the Mediterranean Sea contains about five per cent. of salt, in consequence of the great evaporation which takes place there, and the very narrow inlet by which the water is admitted from the Atlantic. The Indian Ocean is an immense basin of water dividing Africa from Australia. The land consists of two immense continents; and it is remarkable, that the land in the Old World stretches principally from east to west, while the land in the New World runs from north to south. The mountain chains are likewise remarkable, as generally running in the same direction as the land, or from east to west in the Old World, and from north to south in the New World. The principal mountain chains in the Old World are the Aldan, the Altai, the Himaleh, the Hindoo Koosh, and Mount Taurus—all in Asia; in Europe, the Balkan Mountains (with their branch, the Hellenic Mountains), the Carpathian, the Hercynian, the Alps, the Appennines, the Cevennes and Vosges, and the Pyrenees; in Africa, the Atlas Mountains, the Mountains of the Moon, and the Nieuweld Mountains; in North America, the Rocky Mountains, the Appalachian Mountains, and the Maritime chains; the Andes and the Mountains of Brazil in South America:—these are all the great mountain systems of the world, and upon these mountains depend the direction of the rivers, and in many cases the habits and pursuits of the inhabitants. Upon the heights and directions of the mountains depend the size and rapidity, and also the direction of the rivers. Only about one-twenty-fifth part of the land is subjected to cultivation. The vast deserts of Africa, the barren steppes of Asia, and the Prairies, Pampas, and Llanos of America, are never disturbed by the ploughshare. Many portions of the earth are covered with immense forests, where the wild beasts roam undisputed masters.

Specimens of Questions set by Mr. Tate in his Class.

Required the pressure upon the uprights C D, and B F produced by the beam A B, when A B = 30 feet, A C = 10 feet, and the weight of A B = 9 cwts., supposing the beam to be of uniform dimensions, and the prop, B F, to be placed at the extremity.

A rectangular block, C D, is supported from falling by the chord A C, required the tension of this chord, when C D = a, $\angle$ A C D, = α; $\angle$ C D H = ρ and the weight of the block = W.

Find the centre of gravity of the three bodies a, b, and c, whose weights are 4, 6, and 10 lbs. respectively and their distances from the axes O X, and O Y, as marked in the figure.

Find the relation between W and P in the annexed system of pulleys, on the principle of *tension*, as well as on the principle of virtual *velocities*.

Give an example of any other system, and calculate the relation of P and W, when the weights of the pulleys are taken into account.

Give an example of the advantage of pressure gained in—

The compound wheel and axle,

The endless screw,

The crane,
Hunter's screw, &c. &c.

Describe the water-governor.

Compare the momenta of two bodies, whose weights are 6 and 10 stone respectively, moving with velocities of 8 and 14 per second.

Find the units of work in raising 240 lbs. four feet high. (The power to raise 1 pound 1 foot high, being the unit of work.)

Find the units of work in raising the material of a wall 20 feet high, 2 feet thick, 100 feet long, the specific gravity being five times that of water (a cubic foot of water weighing 65·5 lbs).

How far will a body descend in 10 seconds?

Find the velocity acquired by a falling body in 3 seconds?

How long will a body be in acquiring velocity of 64 feet?

Suppose the distance between A and B = 10 feet, let B be projected with a velocity of 10 feet per second, and let A be projected afterwards, with a velocity of 200 feet per second, when will A overtake B?

Write down the ratio between the power and the weight of the three forms of the lever.

Find the equation of equilibrum of any number of bodies A, B, C, D, E, &c., acting downwards on a strong lever.

As an application, take the weight of the lever into consideration, and suppose it = 10 pounds, also suppose in figure (*a*),

A B = 60 pounds
A F = 40 ,,
W = 10 ,, W F = 20 pounds,
P = 20 ,,

Required the position of P when there is an equilibrium also in fig. (*b*), supposed the weight of the beam to be 40 stones, its length 50 feet, A B = 10 feet, find the pressure on the supports at B and F.

Find in figure (*c*) the position of W, if R O = 2 feet, weight of R O = 10 pounds, weight of W = 12 pounds, the pressure upwards on the valve = 60 pounds, and weight of the valve = 5 pounds.

In figure (*d*) required the centre of gravity, A being 60 pounds, B being 40 pounds, and the distance between them = 80 feet.

Find the centre of gravity of three bodies given in position, their weights being 1 pound, 2 pounds, and 3 pounds respectively.

Find the centre of gravity of a triangle, a sphere, a cylinder, a wedge, and of a trapezium, 2 sides being ||.

Explain the action of the syphon, of reciprocating springs, of Artesian wells, of the air-pump, of the common pump.

Describe Bramah's hydraulic press, the forcing pump, Archimedes' screw, the hydraulic ram.

Compare the pressure on the sides of a cubical vessel with that on the base.

Find the height of a cubical vessel, so that the pressure on the sides may be eight times the pressure on the base.

The height of the embankment is 20 feet, the breadth is 10 feet, the length is 100 feet. the specific gravity of the material=3000, find the height of the water so as just to counterbalance the embankment.

Explain the method of finding the specific gravity of bodies.

The weight of a body is 30 grains in air, and 28 grains in water, find specific gravity.

Given the height of the mercury in the barometer, find the pressure of the atmosphere.

Explain the more important effects of heat.

What solid bodies expand most?

Show the application of the relative expansion caused by heat in the construction of the compensation pendulum, in the tire of a wheel, in the bringing back the walls of a house to their vertical position.

Given 1000 cubic inches of gas at 102 degrees, find its volume at 62 degrees.

How does the radiation of heat vary?

Why does boiling water never rise above 212 degrees?

At what temperature will water boil in vacuo; how does this affect the steam-engine?

Give Dalton's experiments?

Explain the formation of clouds and rain?

Explain Hutton's theory of clouds?

Why are mountain tops cold?

Explain the phenomena of the trade winds?

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1. Required the number of horse powers to draw a log of timber along a horizontal plane, the force being applied in the direction of the horizontal plane.

When the weight of timber = 1000 lbs.

Coefficient of friction = $\frac{1}{3}$.

Distance moved = 600 feet; and the time 5 minutes;

$$\frac{1000}{3} \times 600 \text{ units of work done in 5 minutes,}$$

$$\therefore \frac{\frac{1000}{3} \times 600}{5 \times 33000} = 1\tfrac{7}{33} \text{ horse powers.}$$

2. The depth of a mine is 100 fathoms, required to determine the number of horse powers requisite in raising 200 cubic feet of water per minute.

$$65{\cdot}5 \times 200 = \text{weight of water to be raised;}$$

$$\therefore \frac{65{\cdot}5 \times 200 \times 600}{33000} = 227\tfrac{3}{11} \text{ horse power.}$$

3. The train on a railroad, weighs 100 tons, and is drawn along at the rate of 20 miles an hour. What are the number of horse powers, assuming the friction $\frac{1}{200}$ of the load, supposing the road to be perfectly level?

$$\frac{100}{200} = \tfrac{1}{2} \text{ ton} = 1120 \text{ lbs. resistance moved}$$

$\frac{20}{60} = \frac{1}{3}$, or space passed over in 1 minute = 1760 feet; and H.P. = $\frac{1760 \times 1120}{33000} = 59{\cdot}73$

4. Required the same as in the last question, when the inclination of the road is 1 inch for every 500 feet.

$$\frac{W}{P}=\frac{500\times 12}{1}\text{ tons}$$

$$\therefore P=\frac{W}{6000}=\frac{100}{6000}=\frac{1}{60}\text{ ton,}$$

the resistance due to the effect of gravity. But by the question the resistance arising from friction $=\frac{1}{200}$ of the load, or $\frac{100}{200}=\frac{1}{2}$ ton; $\therefore$ the whole resistance $=\frac{1}{2}+\frac{1}{60}=\frac{31}{60}$. Then proceeding, as in the last question,

$$\frac{31\times 20\times 112\times 1760}{60\times 33000}=61\cdot 7\text{ horse power.}$$

Or thus,

The resistance of friction $=\frac{100\times 20\times 112}{200}$; and the resistance due to gravity $=100\times 20\times 112$. Units of work per min. due to friction $=\frac{100\times 20\times 112}{200}\times 1760$; Units of work per min. due to gravity $=100\times 20\times 112\times\frac{1760\times 3\times 20}{500\times 60}$

$$\therefore \text{H P}=\left(\frac{100\times 20\times 112}{200}\times 1760+100\times 20\times 112\times\frac{1760}{500}\right)\div 33000=61\cdot 7.$$

5. Required to find the number of bushels of coals necessary to raise 300 cubic feet of water from a mine, whose depth = 50 fathoms, every minute during the course of a day of 12 hours long, the duty of a steam engine being estimated at 60000000 (that is, the number of units of work performed by a bushel of coal used by the engine).

$300\times 62\cdot 5=$ number of lbs. raised in a minute;

$300\times 62\ 5\times 300=5625000=$ units of work in 1′;

$12\times 60'=720'$ in one day; $\therefore$ the number of bushels $=\frac{5625000\times 720}{60000000}$.

6. Two levels in a mine are to be pumped; the one is 40 fathoms in depth, the other 100 fathoms: from the first we must have 40 cubic feet of water pumped, from the second 20 cubic feet of water, per minute; what must be the horse power and consumption of coals per minute of the engine performing a duty of 60,000,000.

$$\frac{\text{units of work in 1}'}{33000}=\frac{40\times 62\cdot 5\times 6\times 40+20\times 62\cdot 5\times 6\times 100}{33000}=\text{horse power.}$$

And bushels of coals consumed per minute,

$$\frac{40\times 62\cdot 5\times 6\times 40+20\times 62\cdot 5\times 6\times 100}{60,000,000}.$$

7. The area of the piston of a steam-engine is 1000 inches, the number

of strokes per minute 15, and the length of the stroke 8 feet; under what pressure must the engine work in order to perform 50 horse power?

Units of works performed in $1' = 50 \times 33000 = 1650000$. Let x = the required pressure, then

$$1000\,x \times 8 \times 15 = 1650000\,; \quad \therefore\ x = \frac{165{\cdot}0000}{12{\cdot}0000} = 13\tfrac{3}{4} \text{ lbs.}$$

8. What is the pressure of the steam working uniformly when 8000 cubic feet of water is raised every 12 hours from a mine, whose depth is 120 fathoms, the area of the piston being 200 inches, length of the stroke 8 feet, and the number performed in one minute 20?

Here $8000 \times 62{\cdot}5 \times 6 \times 120$ = units of work done, and $200 \times p \times 8 \times 20 \times 720$ = the expression for the units of work arising from the pressure of the steam upon the piston. Hence by equality and division,

$$p = \frac{8000 \times 62{\cdot}5 \times 720}{200 \times 8 \times 20 \times 720} = 15{\cdot}62 \text{ lbs.}$$

9. Taking the same data as in the last problem; required the duty of the engine when the consumption of coals is at the rate of $\frac{3}{4}$ bushels per hour.

$$\text{Duty} = \frac{8000 \times 62{\cdot}5 \times 6 \times 120}{12 \times \frac{3}{4}} = 40000000.$$

10. 6 cwt. of coals are raised from a pit whose depth is 60 fathoms, by means of a rope 4 inches in circumference; required the number of horse power necessary to raise the coals in 4 minutes.

Taking ·046 lbs. as the weight of a rope an inch in circumference and 1 foot long.

the weight of a foot of rope 4 inches in circumference $= 4^2 \times {\cdot}046$.

And the weight of the whole rope $= 4^2 \times {\cdot}046 \times 6 \times 60$.

The units of work to raise ditto $= 4^2 \times {\cdot}046 \times 6 \times 60 \times \frac{6 \times 60}{2}$;

i. e. the weight $\times \frac{1}{2}$ the height raised.

Units of work to raise the coals $= 6 \times 112 \times 6 \times 60$;

$$\therefore \text{ units performed in } 1' = \frac{4^2 \times {\cdot}046 \times 360 \times 180 + 6 \times 112 \times 360}{4}.$$

The result of this expression divided by 33,000 will give us the number of horse power required.

11. What weight W can be raised from a pit in 6 minutes, whose depth is 100 fathoms, using a rope of 5 inches circumference, where the engine works with 8 horse power?

Units of work done in $6' = 8 \times 33{,}000 \times 6$.

But the units of work in the rope $= 5^2 \times {\cdot}046 \times 6 \times 100 \times 300$; $\therefore$ the units of works in the weight W = the difference of these, or $8 \times 33{,}000 \times 6 - 5^2 \times {\cdot}046 \times 180000 =$

Now $W \times 600$ = units of work of W;

$$\therefore W = \frac{8 \times 33{,}000 \times 6 - 5^2 \times {\cdot}046 \times 180000}{600}.$$

12. A winding engine (or an engine turning a drum-wheel so as to raise material from a mine) is observed to raise 10 cwt. in 4 minutes

from a depth of 100 fathoms; the rope is 6 inches in circumference, required the horse power of the engine.

$$\text{Work in the rope} = 6^2 \times \cdot 046 \times 600 \times \frac{600}{2} = 6^2 \times \cdot 046 \times 180000.$$

$$\text{Ditto the weight} = 10 \times 112 \times 600 = 67200.$$

$$\text{Units of work performed in } 1' = \frac{6^2 \times \cdot 046 \times 180000 + 672000}{4};$$

and this result divided by 33,000 gives the number of horse power.

13. The area of the piston is 6000 inches, the length of the stroke is 10 feet, the number of single strokes per minute is 14; the mean pressure upon the piston is 16 lbs.; required the number of horse power and the quantity of water that would be raised per minute from a mine whose depth is 200 fathoms.

$$\frac{\text{Units of work performed in } 1'}{33{,}000} = \frac{6000 \times 16 \times 10 \times 14}{30{,}000} = \text{horse power.}$$

$$\text{Weight of water in lbs.} = \frac{\text{Units of work}}{\text{depth in feet}} = \frac{6000 \times 16 \times 10 \times 14}{6 \times 200}.$$

$$\text{And } \therefore \text{ the number of cubic feet} = \frac{\text{Weight of water in lbs.}}{62 \cdot 5}$$

$$= \frac{6000 \times 16 \times 10 \times 14}{6 \times 200 \times 62 \cdot 5}.$$

14. In an engine working with a mean pressure p, let d = the diameter of the piston, l = the length of the stroke, n the number performed in 1', U the number of units of work done in 1'; required the equation expressing the relation between these quantities.

$$d^2 \times \cdot 7854 \times p = \text{pressure upon piston};$$

$$\therefore d^2 \times \cdot 7854 \times p \times l \times n = \text{U}.$$

Where we have five elements, viz. D, p, l. n, and U, any four of which being given, the remaining one may be found from this equation.

15. To find the labouring force of a cubic foot of water evaporated in the boiler at the temperature of 212°, and condensed into water.

Steam at the temperature of 212° is 1711 times the bulk of the water from which it is raised

A cubic foot of water $\therefore$ will produce 1711 cubic feet of steam.

Let us suppose this steam to be enclosed within a cylinder whose piston is 1 foot area, or 144 inches; then the length of the stroke will be 1711—1; the atmospheric pressure upon this piston will be $144 \times 14 \cdot 7$; and the units of work upon condensation $= 144 \times 14 \cdot 7 \times 1710 = 3619728$.

16. What is the labouring force of a bushel of coals employed in this way, supposing that it requires 1 bushel to evaporate 14 cubic feet of water?

By the last problem the labouring force of 1 bushel will be 14 times the work done by 1 cubic foot of water,

Or, $14 \times 144 \times 14 \cdot 7 \times 1710 = 50676192$.

17. Many of the Cornwall engines perform a *duty* of 70,000,000 (*i. e.* the units of works corresponding to 1 bushel of coals); required the labouring force of 1 lb of coal; and the number of miles which 1 lb. of coal, employed in such engines, will move its own weight over.

Units of work $= \frac{70{,}000{,}000}{84} = 833333{\cdot}3'$; *i. e.* the number of feet 1 lb. is moved over;

$$\therefore \frac{833333'}{1760 \times 3} = 160 \text{ miles } \textit{nearly}.$$

1. The section of a stream of water is 3 feet by 2; the velocity 20 feet per minute; the height of the fall 10 feet. Required to determine the units of work of the water, the modulus being ·5.

2. How many cubic feet of water would be raised from a depth of 20 feet by the wheel in the last example, in a day of 10 hours; assuming that the work done is $\frac{4}{5}$ of the work applied to the wheel?

3. Find the centre of gravity of three bodies, A, B, C, situated on the same right line, whose several weights are respectively 10, 20, 30; and the distances between them 4 and 8 feet.

4. I observe that a stone took 4 seconds in falling from a tower; required its height.

5. What would be the velocity acquired by a body falling for 5 seconds?

6. If a body be projected with a velocity of 96 feet, how high would it ascend? and how long would it take in returning to the ground?

7. What velocity must I give to a body, so as to reach the top of a tower, whose perpendicular height is 256 feet?

8. The long arm of a uniform lever is 10 feet, and the short arm 2 feet; the weight of a unit of length 2 lbs.; what power must be applied so as to raise or move a resistance of 4000 lbs.

9. What weight will a man raise by a common windlass when he exerts a force or pressure of 10 stones upon the handle, the length of which is 20 inches, and the diameter of the axle 4 inches?

10. A man has a roller or axle 6 inches in diameter, and he wishes to raise a tub of coals weighing 700 lbs. by a windlass, whilst he exerts a force of 10 stones; it is required to determine what length he must make his handle.

11. A man finding himself able to exert a force of 16 stones upon the handle of a windlass 24 inches long, when the diameter of the axle is 4 inches, what load must be put in the corf?

12. A railway train of 50 tons travels at the speed of 20 miles per hour; what is the horse power of the engine, taking the friction as usual?

13. Suppose the railway train, in the last example, moves up an incline of 1 in 100 at the same rate; required the horse power.

14. What would be the cost of transferring a train, its load, &c., as in the last example, to the distance of 30 miles, when the engine does a duty of 30,000,000, the price of a bushel of coals being 1*s.* 6*d.*?

15. The area of the piston of a steam engine is 100 square inches, the pressure 10 lbs. per square inch, the length of the stroke 10 feet, the number of single strokes performed in 1 minute 12; required the horse powers.

16. How much water would the engine in the last example pump from a mine, whose depth is 200 fathoms in the course of a day of 10 hours long?

17. How much must the engine in last example be increased in its power so as to raise 3,600,000?

18. What time would a cart and horse take to transport 20,000 lbs

weight of earth to the distance of 6 miles, supposing the horse to travel at the rate of 2 miles per hour, when its traction is 150 lbs., and returns with the empty cart 4 miles per hour; the cart being the third part of the gross load, and the friction the 20th part of the gross load.

19. How long would the horse, in the last example, be in removing 40,000 lbs., taking the friction to be a 40th part of the gross load?

20. Required the units of work performed by a railway train of 50 tons in moving up an incline of 10 miles long, and having a rise of 1 in 200, the friction being as usual 8 lbs. per ton.

21. A train of 50 tons comes down an incline of 1 in 400 with a speed of 40 miles per hour; required the horse power of the engine.

22. What would be the cost of joisting and flooring a room 60 feet long by 18 broad; the joists are 18 inches apart middle and middle; the section of the joists are 9 inches by 3; the rest upon the walls 1 foot; at the following prices: timber 2*s.* per cubic foot; laying on joists and other expenses 5*s.* per square (of 100 feet); the flooring at 7*s.* 6*d.* per square yard?

1. A jet of water, whose section is 1·5 feet, and velocity 10 feet per second, impinges upon a surface which takes up all the work; required to determine the horse power in the water?

2. Required the horse powers in a jet of steam whose section is 2 inches, and the velocity at the rate of 800 feet per second? Supposing that the wheel appropriates all the work.

3. The horse powers of an engine moving a railway train is 2 in excess over the resistance; the railway train, tender, &c. is 50 tons. How long would the engine be in getting up a velocity of 20 miles per hour along the level?

4. A perforation is made in the bottom of a cylinder 64 feet high; the section of the perforation is 10 inches in diameter; required the horse power the water is capable of performing? Supposing the water to keep the same level.

5. Required the cost of building the walls of a house, whose length is 36 feet, breadth 30 feet, perpendicular height from the foundation to the eaves 21 feet, perpendicular height of gable tops 9 feet, allowing 3*s.* 4*d.* per yard upon the whole?

REPORT ON THE TRAINING SCHOOL AT BATTERSEA.

To the Poor Law Commissioners.

GENTLEMEN, January 1, 1841.

THE efforts made by your Assistant Commissioners for the improvement of the training of pauper children in the rural and metropolitan districts, made apparent at a very early period the great difficulty of procuring the assistance of schoolmasters and schoolmistresses acquainted with the principles on which the education of this class of children ought to be conducted.

Very little inquiry confirmed what was previously suspected, that the number of English schoolmasters acquainted with the organization and discipline of elementary schools, and skilful in the application of approved methods of instruction, is exceedingly small, and by no means on the increase. Successive applications were made to those sources from which teachers are usually obtained in England, but these applications were almost invariably unsuccessful, for a variety of reasons.

The teachers trained in the model schools of the metropolitan and other societies enter those schools with the expectation of taking charge of rural or town day schools. They are not instructed in the management of schools of industry. They are not trained in that regulation of the habits of children at meals, in their dormitories, and during hours of recreation, which is essential to the success of a school of industry for pauper children. Moreover, the period during which they receive instruction and are trained in the art of teaching in these model schools is unfortunately very short. Such schools possess slender funds applicable to the maintenance of the candidate teachers. The candidates, therefore, are maintained by their own meagre resources, or are dependent on their friends, in the hope of being able, at the expiration of a short period, to take charge of a school; or they are maintained by the patrons or committee of some school, the mastership of which they are to assume, and which is probably in course of erection. Their attendance on the model school seldom exceeds six months, and often does not extend beyond three. But little reflection is necessary to prove, that in six months they cannot acquire all the knowledge which is desirable either of the principles, the matter, or the art of elementary instruction.

These model schools will ere long be reorganized, with more abundant resources for the training of the candidate teachers, and doubtless the teachers then trained in them will go forth much better prepared for the discharge of their duties than at present.

The introduction of works of industry, however, forms no part of the plan of the improved arrangements hitherto announced, and they afford no means of preparing teachers to learn that system of moral management which is essential to the success of schools for pauper children.

The training of pauper children in a workhouse or district school cannot be successful unless the teacher be moved by Christian charity to the work of rearing in religion and industry the outcast and orphan children of our rural and city population. The difficulty of redeeming

by education the mischief wrought in generations
age can be estimated only by those who know how
children are.

The pauper children assembled at Norwood, from the
and wretched rooms of alleys and courts in the dense part
are often sent thither in a low state of destitution, covered
rags and vermin; often the victims of chronic disease; alm
versally stunted in their growth; and sometimes emaciated with
The low-browed and inexpressive physiognomy or malign aspect o
boys is a true index to the mental darkness, the stubborn tempers,
hopeless spirits, and the vicious habits on which the master has to work. He needs no small support from Christian faith and charity for the successful prosecution of such a labour; and no quality can compensate for the want of that spirit of self-sacrifice and tender concern for the well-being of these children, without which their instruction would be anything but a labour of love. A baker, or a shoemaker, or a shop apprentice, or commercial clerk, cannot be expected to be imbued with this spirit during a residence of six months in the neighbourhood of a model school if he has not imbibed it previously at its source.

The men who undertake this work should not set about it in the spirit of hirelings, taking the speediest means to procure a maintenance with the least amount of trouble. A commercial country will always offer irresistible temptations to desert such a profession, to those to whom the annual stipend is the chief, if not sole motive to exertion. The outcast must remain neglected, if there be no principle, which, even in the midst of a commercial people, will enable men to devote themselves to this vocation from higher motives than the mere love of money.

Experience of the motives by which the class of schoolmasters now plying their trade in this country are commonly actuated, is a graver source of want of confidence in their ability to engage in this labour than the absence of skill in their profession. A great number of them undertake these duties either because they are incapacitated by age or infirmity for any other, or because they have failed in all other attempts to procure a livelihood, or because, in the absence of well-qualified competitors, the least amount of exertion and talent enables the most indolent schoolmasters to present average claims on public confidence and support. Rare indeed are the examples in which skill and principle are combined in the agents employed in this most important sphere of national self-government. Other men will not enable you to restore the children of vagabonds and criminals to society, purged of the taint of their parents' vices, and prepared to perform their duties as useful citizens in a humble sphere.

The peculiarities of the character and condition of the pauper children demand the use of appropriate means for their improvement. The general principles on which the education of children of all classes should be conducted are doubtless fundamentally the same; but for each class specific modifications are requisite, not only in the methods, but in the matter of instruction.

The discipline, management, and methods of instruction in elementary schools for the poor, differ widely from those which ought to cha-

in town
y of distinct metho
larity of the pauper c
misfortune, or indolence, or vice, have su
instances children descend from generations o
have been born in the worst purlieus of a great city, or in
ost wretched hovels on the parish waste. They have suffered
vation of every kind. Perhaps they have wandered about the
country in beggary, or have been taught the arts of petty thieving in
the towns. They have lived with brutal and cruel men and women,
and have suffered from their caprice and mismanagement. They have
seen much of vice and wretchedness, and have known neither comfort,
ndness, nor virtue.

If they are sent very young to the workhouse, their entire training
in religious knowledge, and in all the habits of life, devolves on the
schoolmaster. If they come under his care at a later period, his task
is difficult in proportion to the vicious propensities he has to encounter.

The children to whose improvement Pestalozzi devoted his life were
of a similar class,—equally ignorant, and perhaps equally demoralized,
in consequence of the internal discords attendant on the revolutionary
wars, which at the period when his labours commenced had left Switzer-
land in ruin.

The class of children which De Fellenberg placed under the charge
of Vehrli at Hofwyl were in like manner picked up on the roads of
the canton—they were the outcasts of Berne.

These circumstances are among the motives which led us to a careful
examination of the schools of industry and normal schools of the can-
tons of Switzerland. These schools are more or less under the influence
of the lessons which Pestalozzi and De Fellenberg have taught that
country. They differ in some important particulars from those which
exist in England, and the experience of Switzerland in this peculiar
department of elementary instruction appears pre-eminently worthy of
attention.

Those orphan and normal schools of Switzerland which have paid
the deference due to the lessons of Pestalozzi and De Fellenberg are
remarkable for the gentleness and simplicity of the intercourse between
the scholar and his master. The formation of character is always kept
in mind as the great aim of education. The intelligence is enlightened,
in order that it may inform the conscience, and that the conscience,
looking forth through this intelligence, may behold a wider sphere of
duty, and have at its command a greater capacity for action. The
capacity for action is determined by the cultivation of habits appropriate
to the duties of the station which the child must occupy.

Among the labouring class no habit is more essential to virtuous
conduct than that of steady and persevering labour. Manual skill
connects the intelligence with the brute force with which we are
endued. The instruction in elementary schools should be so conducted
as not only to assist the labourer in acquiring mechanical dexterity, but
in bringing his intelligence to aid the labours of his hands, whether by

...nenomen... ...a commercial co... ...ive him ...ch an acquaintance wi... ...enterprize at hom.e, or may tend to swel... ...ation which is daily extending the dominion of Br... merce and civilization. Labour, which brings the sweat upon the ... requires relaxation, and the child should therefore learn to repo... toil among innocent enjoyments, and to avoid those vicious indulge... which waste the labourer's strength, rob his house of comfort, an... must sooner or later be the source of sorrow. There is a dignity in the lot of man in every sphere, if it be not cast away. The honour and the joy of successful toil should fill the labourer's songs in his hour of repose. From religion man learns that all the artificial distinctions ... society are as nothing before that God who searcheth the heart. R... gion therefore raises the labourer to the highest dignity of hum... existence, the knowledge of the will and the enjoyment of the favo... of God. Instructed by religion, the labourer knows how in daily toil he fulfils the duties and satisfies the moral and natural necessities of his existence, while the outward garb of mortality is gradually wearing off, and the spirit preparing for emancipation.

An education guided by the principles described in this brief sketch, appears to us appropriate to the preparation of the outcast and orphan children for the great work of a Christian's life.

After a trial of various expedients, to which allusion has been made in preceding reports, it became apparent that the means of embracing within one comprehensive plan the training of the 50,000 pauper children now in the workhouses did not exist in this country; and the importance of not abandoning these children to the consequences of the misfortunes and vices of their parents grew in proportion to the difficulties with which the subject was encumbered.

That which seemed most important was the preparation of a class of teachers who would cheerfully devote themselves, and with anxious and tender solicitude, to rear these children, abandoned by all natural sympathies, as a wise and affectionate parent would prepare them for the duties of life.

To so grave a task as an attempt to devise the means of training these teachers, it was necessary to bring a patient and humble spirit, in order that the results of experience in this department might be examined, and that none that were useful might be hastily thrown aside. Our examination of the continental schools was undertaken with this view. A visit was made to Holland at two successive periods, on the last of which we took one of Dr. Kay's most experienced schoolmasters with us, in order that he might improve himself by an examination of the methods of instruction in the Dutch schools, all the most remarkable of which were minutely inspected. A visit has been paid to Prussia and Saxony, in which several of the chief schools have been examined with a similar design. Two visits were paid to Paris, in which the normal school at Versailles, the Maison Mère, and Noviciate of the Brothers of the Order of the Christian Doctrine, and a great number of the elementary schools of Paris and the vicinity, were exa...ined. The normal school at Dijon was especially recommended to